

ENCAD®

NOVAJET® PROe

EXTREME COLOR
PRINTING™



SERVICE MANUAL

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**NOVAJET® PROe
SERIES
COLOR INKJET
PRINTER
SERVICE MANUAL**

Part Number 209053

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This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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ENCAD, Inc. U.S.A

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To obtain a Material Safety Data Sheet, contact **ENCAD, Inc.** at:

6059 Cornerstone Court West
San Diego, CA 92121-3734
(619) 452-4350

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ENCAD reserves the right to make changes or improvements to Products, without incurring any obligation to similarly alter Products previously purchased.

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- **Unauthorized modification of the Product.**
- **Adverse environmental conditions.**
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- **Unauthorized or improper use, including but not limited to:**
 - **Use in applications for which the Product was not designed.**
 - **Using cartridges or ink other than those supplied by ENCAD or authorized ENCAD resellers.**
 - **Using media other than that supplied by ENCAD or authorized ENCAD resellers.**
 - **Lubricating any part of the printer.**

Internationally: Contact your dealer or distributor for warranty information.

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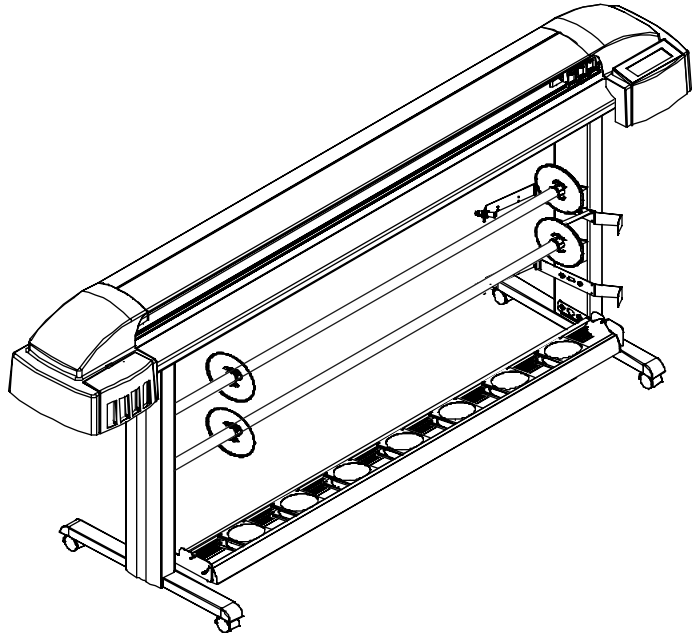


Figure 1-1. Novajet PROe Series Inkjet Printers.

Introduction

This manual provides service information for the **ENCAD®, Inc. Novajet® PROe** Series Color Inkjet Printer. There are two versions of the **Novajet PROe** printer: **Novajet PRO 42e** and **Novajet PRO 60e**.

It is written for service personnel who possess analog and digital circuitry experience. Chapter 2, Theory of Operation, should be read and thoroughly understood before troubleshooting/calibrating the printers.

The printers support pre-cut and roll media. Media size is automatically determined and hardclip limits are set accordingly. Pre-cut media uses different maximum plotting areas than roll media. See the Printer Specifications for more details.

Both RS-422 serial and Centronics parallel connections are provided to interface with the host computer. Commands sent from the host computer can be in several forms including **HP-RTL**, and **Encad RTL** formats.

Drivers are supplied to support Windows-based PC's (3.XX, 95, and NT) as well as Macintosh and Power PC computers.

These printers expand upon **ENCAD's** tradition of delivering fast, high-quality color or monochrome graphics for a variety of applications. **ENCAD** has made significant advances in designing these printers to respond to and anticipate our customers' needs. Principal features are summarized below.

- Locally or Remotely Configured via Host Computer
- Powered Media Take-Up and Feed System
- Media Drying System
- Quick Ink Changeover
- Self-Aligning Pinch Rollers
- PowerPC 33 MHz Microprocessor
- 8 User Configurable Settings
- 104 Jet Ink Cartridges
- Ink Priming System
- 500ml Ink Reservoirs
- Smart Cartridges

Overview

Printers draw according to instructions issued from a “host” computer. Every printer is engineered to understand a specific set of instructions and to execute each instruction in a precise manner. In addition, most printers are designed to execute predetermined characters automatically without a specific line-by-line instruction from the program. These characters are part of the printer’s permanent memory.

Related Publications

The following publication contains additional information which may be useful in servicing the **ENCAD, Inc. Novajet PROe** Color Inkjet Printers:

- **ENCAD, Inc. Novajet PROe** User Guide,
P/N 208713-1

Copies of this and other **ENCAD, Inc.** publications may be obtained by contacting your nearest authorized **ENCAD, Inc.** dealer or by contacting **ENCAD’s** Technical Support and Service Department.

Electrostatic Discharge (ESD) Sensitivity

All PCBs (Printed Circuit Boards) associated with the **Novajet PROe** printers have components sensitive to ESD (electrostatic discharge). Care must be taken to avoid damage to any of the components by following current ESD handling procedures and practices.

Always use an approved ESD grounding strap when handling or working with PCBs.

Warnings, Cautions, and Notes

Warnings, cautions, and notes are used when additional information, instructions, or care should be observed. In this manual, warnings cautions, and notes precede the text to which each applies. The definition of each is provided below.

WARNINGS - Warnings are used to stress that the following steps or procedure has the potential to cause serious harm or death to service personnel. Extreme care should be observed when following the procedures and to exercise standard safety procedures. They are indicated by:



Followed by a paragraph describing the concern.

CAUTION - Cautions depict that the following steps or procedures can cause damage to the equipment if not properly followed. Extreme care should be observed when following the procedures and to exercise standard safety procedures. They are indicated by:



Followed by a paragraph describing the concern.

NOTE - Notes are placed before a procedure to inform the service personnel of specific details to improve quality, to give reminders of interrelated parts, and to provide other helpful information. They are indicated by:

NOTE

Followed by a paragraph describing the concern.

Printer Specifications

GENERAL
DESCRIPTION

The specifications and performance characteristics of the **Novajet PROe** Color Inkjet Printers are as follows:

Max Printing Area:

	<u>PRO 42e</u>	<u>PRO 60e</u>
Norm	40.8" 1.04m	58.8" 1.49m
Extend	41.61" 1.06m	59.61" 1.51m

Language Emulation:

HP-RTL
ENCAD RTL

Buffer:

8 MB installed
upgradeable to 16, 32,
and 64 MB

Power Requirements:

Input Voltage:
90-246 VAC
47-63 Hz

Output Power:
20 W idle
140 W typical
215 W maximum

Baud Rates:

9600, 19200
38400, 115200

Resolution:

Mono 300x300 dpi
Color 300x300 dpi

Accuracy:

0.2% line length (with
ROLL mode off)

Interface:

Centronics parallel
(IEEE 1284)
RS-422 serial
Network Option: via
10BaseT, 10Base2
Print Server

Environment:

Operating:
59° to 95° F
(15° to 35° C)
10% to 70% RH
non-condensing

Storage:
-5° to 140° F
(-21° to 60° C)
5% to 80% RH
non-condensing

Dimensions:

Height 44" (1.12m)

Width 77" (1.96m)
PRO 42e

95" (2.41m)
PRO 60e

Depth 28" (0.71m)

Contents of this Service Manual

Figures are used in this manual to clarify procedures. They are for illustrative purposes only and may not necessarily be drawn to scale.

Material in this manual may be repeated in various chapters so that each chapter can “stand alone”. This allows information to be located without having to refer back and forth between chapters.

Figures and tables are easily located and cross-referenced, and are listed in the front of the manual under List of Illustrations and List of Tables.

This manual is divided into six chapters as:

Chapter 1 GENERAL DESCRIPTION - Contains a general description of the **ENCAD Novajet PROe** printer. This includes printer specifications, and related materials. Also included is a description of the use of Warnings, Cautions and Notes as used in this manual and chapter contents.

Chapter 2 THEORY OF OPERATION - Functional descriptions of the overall printer and major assemblies are contained in this chapter.

Chapter 3 MAINTENANCE - This chapter covers the scheduled maintenance, cleaning procedures and alignment/adjustments recommended to perform on the printers. Diagnostics and a signal flow diagram are also listed.

Chapter 4 TROUBLESHOOTING - A table containing problems that could occur and possible causes and repairs is found in this chapter. This table is not intended to be a complete listing of troubleshooting procedures. It will isolate the problem down to the lowest replaceable assembly. If the problem happens to be the wiring between assemblies, standard troubleshooting techniques will have to be implemented to correct the problem.

Chapter 5 ASSEMBLY/DISASSEMBLY - Contains detailed procedures to remove and replace printer parts and assemblies.

Chapter 6 PARTS LIST - Contains a complete listing of all field replaceable parts and assemblies for the **Novajet PROe** Color Inkjet Printer. Illustrated parts breakdown drawings are included to help clarify and identify parts for ordering. Special kits and adjustment jigs may also be required.

ORIENTATION - Instructions in this manual are based on the assumption that the service person is facing the front of the printer. References to top view, back view, and so forth are consistent with this engineering standard. References to the X Axis and Y Axis (Paper Axis and Carrier Axis, respectively) follow the standard of **AutoCAD™** absolute coordinates: up and down for X, left to right for Y.

Technical Support

ENCAD offers full technical support and service for its various products. If you are unable to find the answer to your question in either the User's Guide, Service Manual, or other related publications, check out **ENCAD's** Technical Bulletins located on **ENCAD's** bulletin board or the Internet:

ENCAD BBS:	(619) 452-2653 or (619) 452-3768
ENCAD Website:	http://www.encad.com

Additional information is available through our Technical Support and Service Department's Help Desk.

ENCAD, Inc.
Technical Support & Service Dept.
6059 Cornerstone Court West
San Diego, CA 92121

Help Desk Telephone:	(619) 452-4350
Help Desk FAX:	(619) 546-0659

International Users contact your local **ENCAD** service provider. see details on your **ENCAD** registration card.

Introduction

This chapter explains the mechanical and electrical theory of operation of the **ENCAD Novajet PROe** Series Color Inkjet printer.

The **Novajet PROe** is a PowerPC 33MHz microprocessor-based digital printer that receives plotting instructions from a host computer through either the RS-422 serial interface or the Centronics parallel interface.

Novajet PROe Printer General Block Diagram

Figure 2-1 illustrates the major functional areas of the printer.

The Novajet PROe printer consists of three mechanical assemblies:

1. Paper (Media) Axis Drive
2. Carrier Axis Drive
3. Media Feed and Take-Up System

and four main electrical assemblies:

1. MPCB (Main Printed Circuit Board)
2. Carrier Assembly
3. Keypad
4. Power Supply

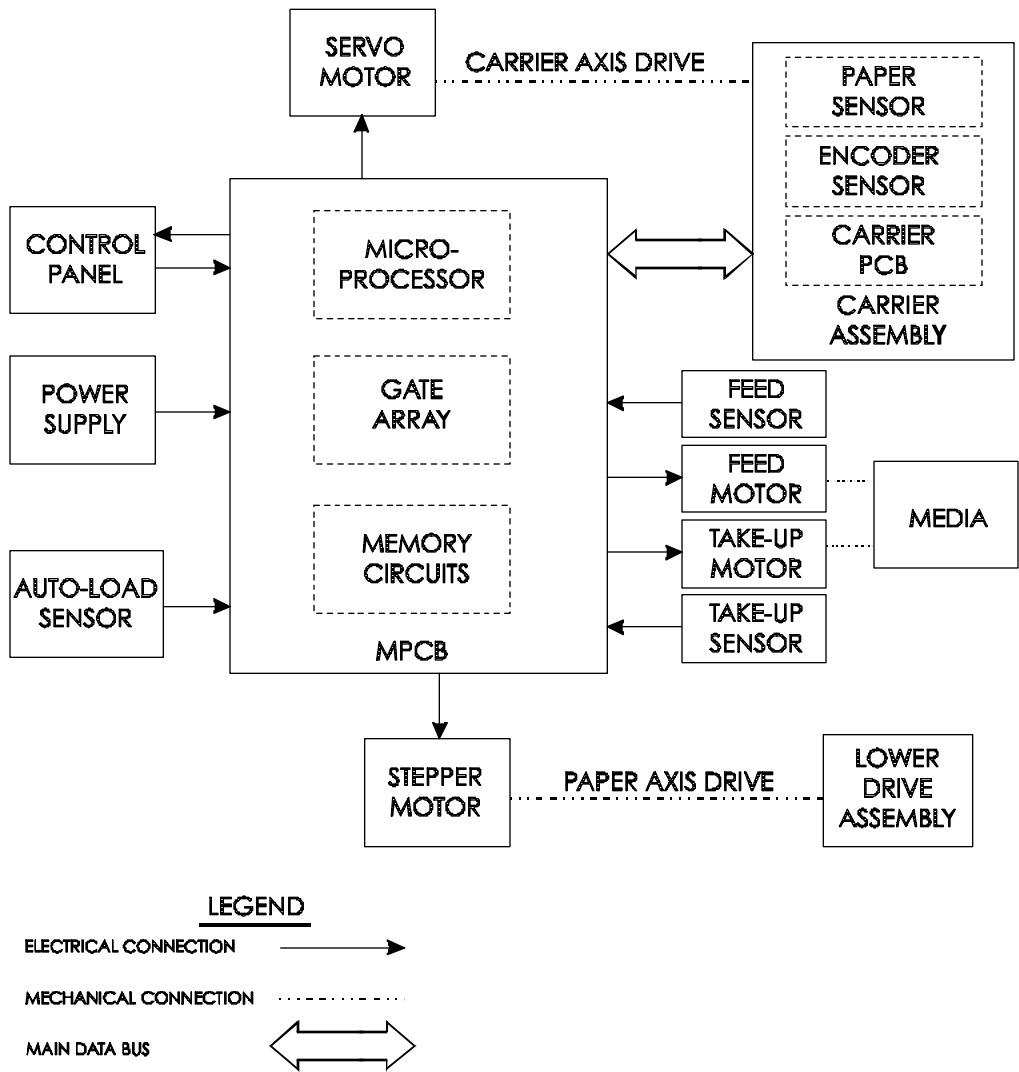


Figure 2-1. General Block Diagram.

Paper (Media) Axis Drive

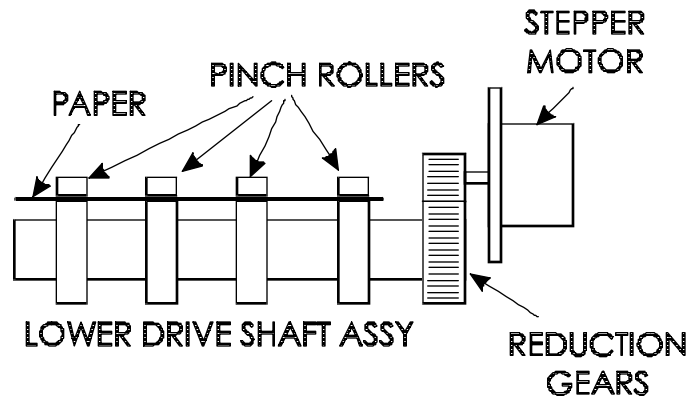


Figure 2-2. Paper (Media) Axis Drive.

The Paper (Media) Axis Drive moves the plotting media in a direction perpendicular to the length of the printer. This friction drive utilizes a micro-step drive technology and consists of a stepper motor, reduction gears, lower drive shaft assembly, and pinch wheels. This can be seen in figure 2-2.

The micro-step technology associated with the stepper motor gives the capability of a resolution up to 9600 dpi.

The reduction gear meshes the stepper motor to the lower drive shaft assembly which allows the media to advance or retract. The purpose of the pinch wheels is to apply pressure to the media onto the drive shaft assembly to reduce the chance of slipping.

Misaligned pinch wheels is the main cause of skewing of the media.

The Carrier Axis Drive

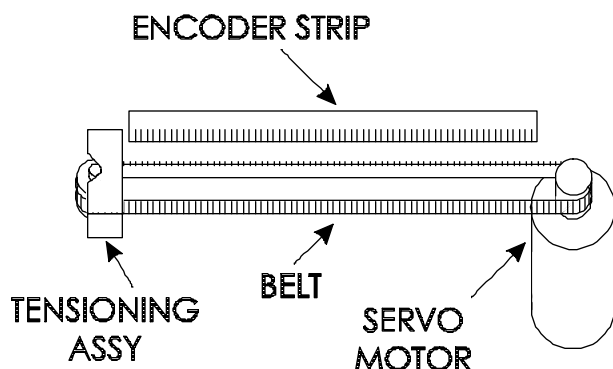


Figure 2-3. Carrier Axis Drive.

The Carrier Axis Drive moves the printer's carrier assembly along the length of the printer. The drive consists of a servo motor, linear encoder strip, drive belt, and tensioning assembly. These items are illustrated in figure 2-3.

The servo motor, drive belt, and tensioning assembly are the components that actually drive the carrier assembly. The servo motor drives the belt back and forth allowing the attached carrier assembly to be repositioned as required. The tensioning assembly is spring controlled and allows the proper amount of tension on the belt.

The linear optical encoder strip is used to obtain the printers accuracy along the axis of the printer. It is made with 150 parallel lines per inch etched into it. By utilizing two optical encoder sensors that are slightly off set from each other, and reading the leading and trailing edges of the lines, a resolution of 600 dpi can be obtained.

The stepper and servo motors are controlled from the main printed circuit assembly by the microprocessor.

Media Feed and Take-Up System

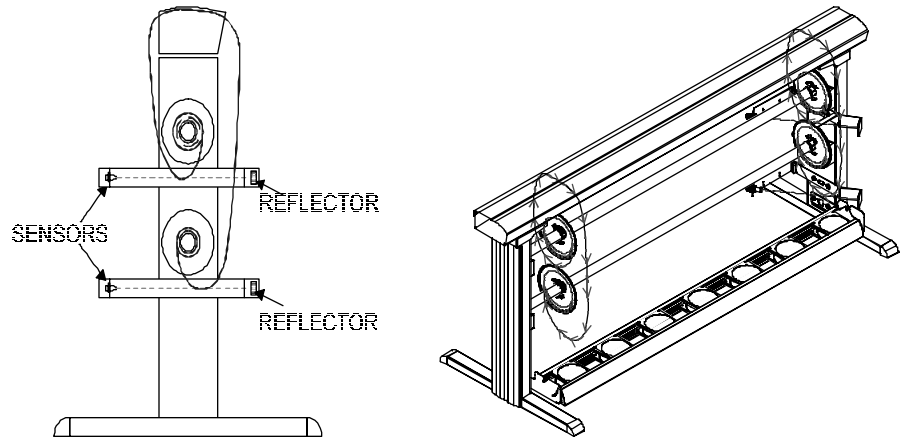


Figure 2-4. Power Feed and Take-Up System.

The media feed and take-up system comprises of two optical sensors and two dc motors. See Figure 2-4.

The motors are used to advance the media feed roll and the media take-up roll dependant upon the signals they receive from the MPCB. The MPCB generates the control signals for the motors from the information it receives from the media feed and take-up sensors.

The optical sensors are designed to inform the MPCB when there is not a proper amount of slack in the media by sensing the 'curl' of the media at the bottom of its loop. This method is used so that all approved forms of media (including transparent backlit media) is able to take advantage of the power feed and take-up system.

Main Printed Circuit Board (MPCB)

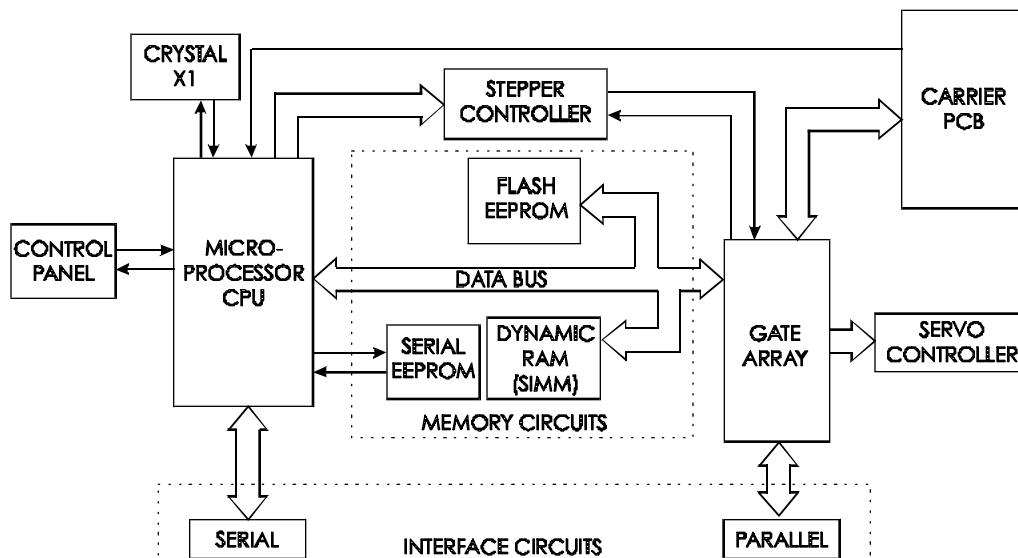


Figure 2-5. Main Printed Circuit Board.

The Main Printed Circuit Board (MPCB) consists of six functional areas:

1. Microprocessor (CPU)
2. Gate Array
3. Memory Circuits
4. Stepper Motor Controller
5. Servo Motor Controller
6. Interface Circuits: Serial & Parallel

Microprocessor

The microprocessor (an IBM PowerPC) is the central processor unit which supervises system functions, executes the printer firmware, manipulates data, and controls input/output data busses. It has two built-in serial ports, a two channel DMA (Direct Memory Access) controller, a timer module, clock generator, and an on-board chip select generator. One serial port connects to the Mini-DIN connector which can be used to communicate with the host computer; the other serial port interfaces to the Control Panel. One DMA channel supplies data to the gate array for jet firing; the other DMA channel is used to receive data through the parallel port via the gate array, or the serial port when using a high speed serial mode. One timer generates a servo interrupt every millisecond; the other is used for timing the Stepper Motor.

A divide-by-two circuit generates the 33MHz system clock from a 66MHz crystal reference (X1).

The chip select generator is programmed to generate chip selects at the appropriate addresses, with the appropriate data size (byte, word) and with the appropriate number of wait states.

Gate Array

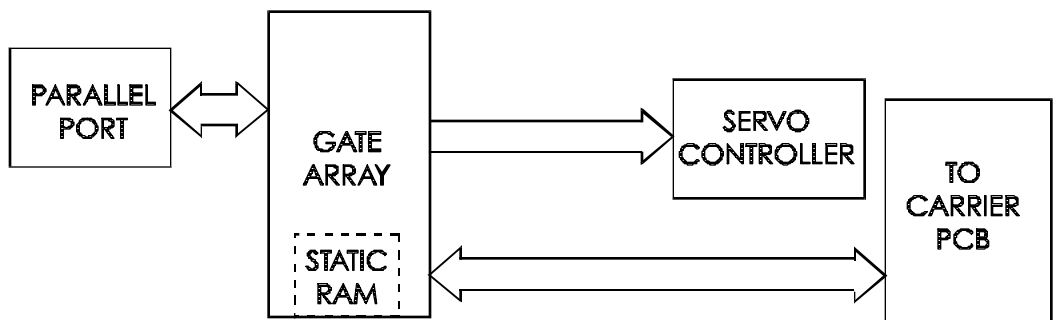


Figure 2-6. Gate Array.

The gate array contains the hardware logic for dot firing, monitoring changes in the Carrier Assembly position, controlling DMA through the parallel port, and generating the PWM (Pulse Width Modulation) waveforms for the servo controller.

The gate array is a Xilinx device. It is a static RAM-based field programmable gate array. This means that the logic that it implements is determined by configuration information in internal RAM storage. Each time power is turned on, this information must be downloaded from the system ROM. This type of gate array allows for the flexibility of upgrading the logic by simply downloading the new system software.

Memory Circuits

Memory is used to retain large amounts of information. This information is stored in the device memory in the form of binary bits.

Printer memory consists of Flash EEPROM, DRAM, and EEPROM.

Maximum installable memory is as follows:

DRAM = 132 MB

Flash EEPROM = 1 MB

Serial EEPROM = 1KB

Flash EEPROM

Flash EEPROM is Electrically Erasable, Programmable, Read Only Memory used to store instructions and data constants which the microprocessor can access and interpret, with no loss of information when power is off.

The system firmware is stored in Flash EEPROM. The Flash EEPROM allows the firmware to be upgraded by simply downloading a file containing the new firmware. It can be erased and reprogrammed more than 10,000 times. The term “Flash” means that bytes cannot be individually erased. A block or the whole device is erased at the same time and the block or whole device is then reprogrammed.

The normal method of downloading new firmware is to send the printer a file of the new code. This requires using an appropriate host utility. This can be done through either the serial or parallel port. This method requires code to be running in the printer to interpret the file.

If, for some reason, the EEPROM is blank or corrupt, there is an additional step to download firmware to the printer. This additional step requires a special J Tag Adapter to be placed between the parallel cable and J16 on the printer's MPCB. It is a required step that allows some registers and DRAM to be written to, based upon commands sent through the port. See Firmware Downloading in Chapter 3 for more information.

DRAM

DRAM is Dynamic Random Access Memory which provides temporary storage of the microprocessor calculation and input/output data. It is also a faster type of memory than the Flash EEPROM. That's why the printer control program is also copied from the Flash EEPROM to RAM, where it can be executed faster.

The printer also has two 72-pin 32-bit SIMM sockets for DRAM. The printer is supplied with a SIMM of 8 Megabytes installed on the MPCB. The following SIMM sizes are supported: 4MB (1Mx32), 8MB (2Mx32), 16MB (4Mx32), and 32MB (8Mx32.)

The SIMMs must have a minimum operating speed of 70ns, and conform to JEDEC Standard 21-D release 4 or later. Remove the Right Cover to install additional memory (see Chapter 6 for installation procedures.) Care must be taken when choosing a SIMM module for the printer. Not all SIMM's on the market today will work on the printer. It has to do with the "presence detect" signals on pins 67 and 68 of the SIMM's. Not all SIMM manufacturers use these signals, so they disable them. Recommended SIMM's to be used are listed in the User Guide.

Serial EEPROM

Serial EEPROM is an Electrically Erasable, Programmable, Read Only Memory which provides storage for calibration constants and user configuration data entered from the host computer.

An 8K bit serial non-volatile EEPROM stores calibration and configuration information. It retains data while the unit is off.

Stepper Motor Controller

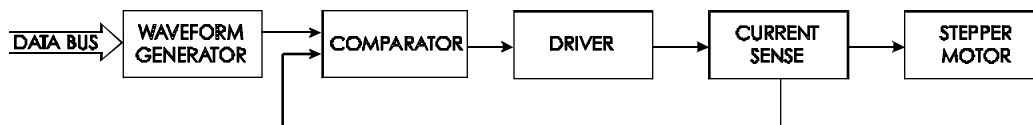


Figure 2-7. Stepper Motor Controller.

The media is driven by a Stepper Motor, which drives the media in a direction perpendicular to the width of the printer. The media in the printer can advance forward and backward, depending upon the commands which the Stepper Motor receives from the microprocessor.

The Stepper Motor Controller contains two identical circuits, one for each winding of the stepper motor. The circuit is a combination of two simpler types of circuits and can be thought of as a variation of either one.

A waveform generator receives digital data from the CPU and generates a sine wave output. This signal is fed into a comparator circuit that is measuring the current through the winding of the stepper motor. If the current is too low, a pulse of 24V is generated. When the current goes above the output of the waveform generator, the pulse turns off. Every time the output of the waveform generator is changed by the microprocessor, the motor moves 1 “micro-step”.

Each circuit contains four main blocks (see Figure 2-7):

1. Reference waveform generator

The microprocessor uses a D/A (digital to analog) converter to set the desired level for the current in the stepper motor winding. The output of the D/A converter varies in time to create a reference waveform. This reference waveform is centered around 10V.

2. Motor current sense

The voltage across a series current sense resistor is measured and level shifted so that it is centered around 5V.

3. Comparator

This portion divides the output of the reference waveform generator by two and compares it to the output of the motor current sensor. Logic inside the gate array generates the control signals for the power driver that applies voltage across the motor winding in order to make the actual current match the reference waveform.

4. Power driver

An H-bridge allows the supply voltage to be applied across the winding in either polarity to drive the current to the desired value.

Servo Motor Controller

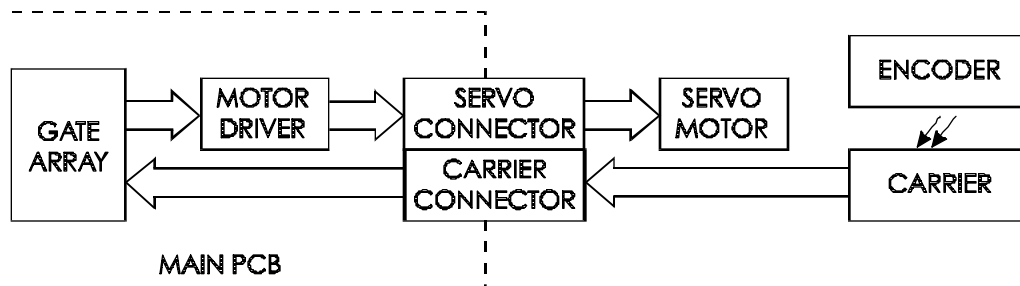


Figure 2-8. Servo Motor Controller.

The Carrier Assembly is driven by the Servo Motor. The speed of the Carrier Assembly is controlled by varying the duty cycle of the power applied to the controller. The microprocessor checks the position of the Carrier Assembly approximately 1,000 times per second (during the servo interrupt). It then updates the PWM (pulse width modulator) register in the gate array which sets the duty cycle to make adjustments to the Carrier Assembly speed. A linear optical encoder is used to monitor the Carrier Assembly position.

The optical encoder strip runs the length of the Stabilizer Bracket and contains 150 lines and spaces per inch. Thus there are 300 edges per inch. The detector circuit actually consists of two optical edge detectors. They are separated from each other by one half the width of one of the optical lines on the encoder strip. This allows 4 evenly spaced pulses to be developed for each line on the encoder strip. This is known as quadrature signals. It gives an effective resolution of 600 lines per inch. See figure 2-9 for a graphical representation of quadrature signals. For 300 dpi resolution, one of the detectors is not used.

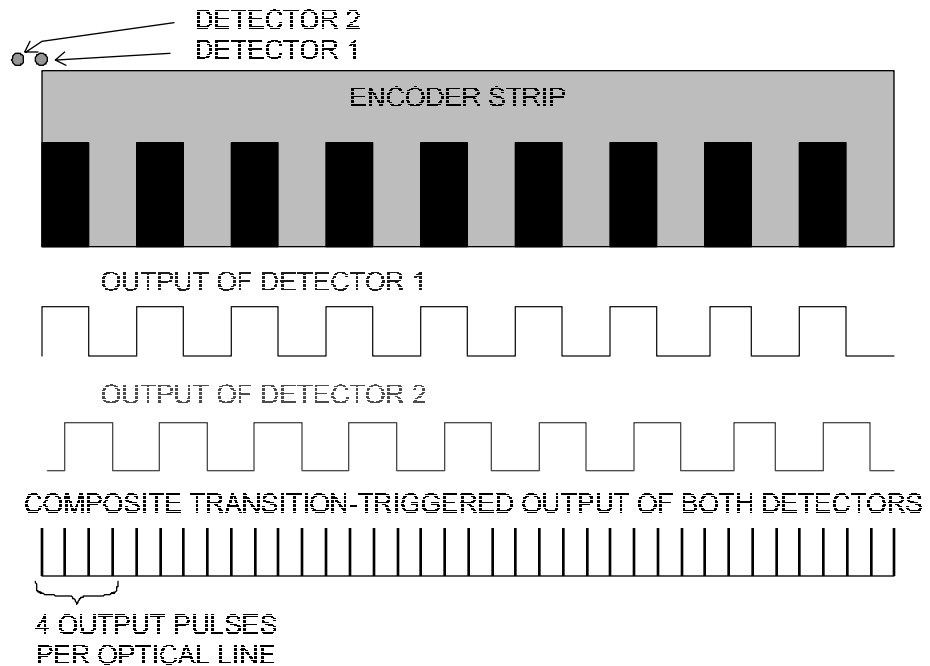


Figure 2-9. Quadrature Signal Generation.

The direction that the Carrier Assembly is moving is known based upon the state of one detector's output and the direction of the transition of the other detector's output.

A hardware counter in the gate array increments as the Carrier Assembly moves left and decrements as the Carrier Assembly moves right. The hardware counter is only eight bits wide, so it cannot store a value large enough to represent an absolute Carrier Assembly position. Instead, it is read during the servo interrupt and its value compared with that from the previous interrupt. This difference is used to update the absolute position value in the software.

Interface Circuits: Serial & Parallel



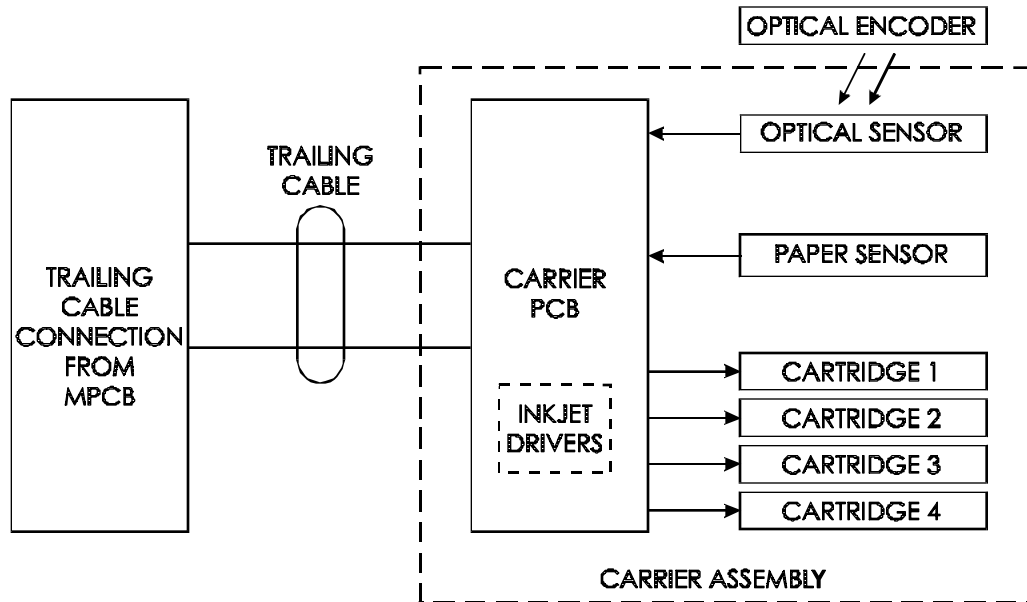
Figure 2-10. Interface Circuits.

Data from the host computer is received either through the Centronics parallel port or the serial port. The gate array provides the control signals for DMA transfers from the parallel port to DRAM.

The serial port is designed primarily to interface to a Macintosh printer port. It has an eight pin Mini-DIN connector. The data (TXD, RXD) signals meet RS-422 electrical specifications, and the control signal (DTRCLK) meets the RS-423 electrical specifications. The control signal can be configured as a 1MHz clock for high speed serial communications with a Macintosh.

The serial port is compatible with RS-422 devices when an appropriate adapter cable is used. This cable is available from **ENCAD**.

Carrier Assembly Circuits



THEORY OF
OPERATION

Figure 2-11. Carrier Assembly Circuits.

The Carrier Assembly contains:

- 1) Carrier PCB
- 2) Optical Sensors
- 3) Paper Sensor
- 4) Inkjet Cartridges

The Carrier PCB contains the logic and drive circuitry for the firing of the inkjet cartridges. It also establishes an interface path for the optical sensor and paper sensor to communicate with the MPCB.

The optical sensors receive their inputs from the optical encoder strip and sends this data to the MPCB. The MPCB uses this information to determine the horizontal position of the carrier assembly so that accurate printing can be established.

The paper sensor circuitry senses for the presence of loaded media. It does this automatically during the start-up and load sequences. It also constantly monitors the media during printing to determine if the media has run out.

If no paper is sensed, the paper sensor sends this information to the MPCB, which immediately begins an 'out of paper' subroutine. This subroutine starts the LEDs on the printer to blink (green blinks slow while yellow blinks faster.) It also informs the host computer of the situation and stops the printer from printing until more media is loaded.

The sensor also checks for the size of the media loaded so it can determine the proper printing parameters.

Keypad

The Keypad is located on the right side of the printer and consists of 8 variable-action control buttons and an LCD graphics display. The control buttons are assigned different functions and are dependant upon the selections that are presently shown on the graphics display. There are four buttons on the left of the display and four buttons on the right, with the display showing up to eight possible selections.

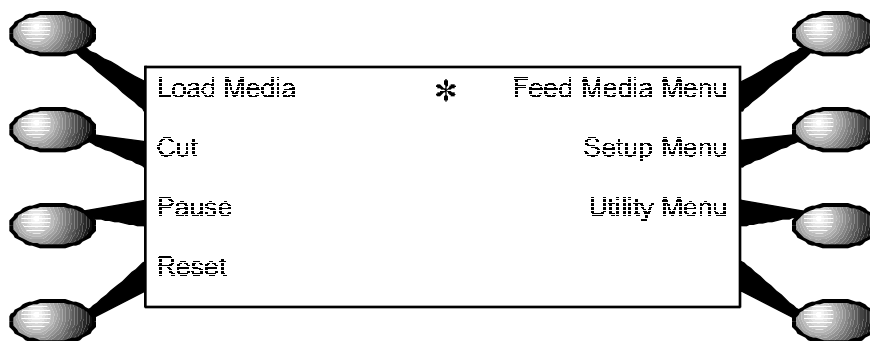


Figure 2-12. Main Menu.

Figure 2-12 shows the keypad after the printer has been turned on and finished the start up process. As seen in the figure, the control buttons are assigned to the corresponding command that is displayed closest to the physical location of the button.

Power Supply

An internal UL recognized switching power module supplies power for the **Novajet PROe** printer. It provides a constant 24VDC output from input voltage in the range of 90-246 VAC. A power switch turns the power on and off. The 24VDC is applied to the MPCB where it is further regulated and separated into 24VDC, 13VDC, and 5VDC. The 24V supply is used for: the stepper controller (which advances the paper); the servo controller (which moves the Carrier); and power to fire the inkjets. The 5V supply powers the logic circuits.

The power supply is fused using a 2A 250V fast blow type fuse.

The outputs share a common ground which is isolated from earth ground within the supply itself. Earth ground and DC ground are connected external of the power supply.

The power supply will shut down under overload/short circuit conditions on any output over the full range of input voltage. Overvoltage protection is 20%-30% above nominal for the 24V output.

Beeper and Fans

The beeper contains built-in driver circuitry so that it beeps under firmware control. The beeper alerts the user to error conditions.

There exists three types of fans on the Novajet PROe series printers.

A single fan, located behind the power supply, is used for cooling the power supply. Air blows over the power supply and the heated air is forced out the back of the printer.

A fan is located inside the platen with its fan vent seen from under the platen on the right side of the printer. This fan provides suction on the platen bed and holds the paper (media) flat during the printing process. The PRO 60e version has an additional suction fan located near the center of the printer inside the platen.

A fan assembly is attached to the lower part of the printer legs that is used to speed up the drying time of the ink that is deposited onto the media. This is to ensure that the ink is completely dry before the media is rolled onto the take-up reel. The PRO 42e has five drying fans, while the PRO 60e version has seven.

The drying fan assembly has been designed to keep power consumption down to a minimum by only activating the amount of fans that are required to dry the size of media that is loaded on the printer.

The drying assembly can also be disabled thru the printers firmware via the keypad.

Introduction

This chapter contains general maintenance and cleaning instructions for the Novajet PROe series printers.

Scheduled Maintenance

Scheduled maintenance consists of a list of checks that are planned to be performed on a regular basis or when conditions warrant it.

Scheduled maintenance can be thought of as preventive maintenance since its purpose is to prolong the life of the printer. It is not intended to repair or isolate an existing problem, though it can sometimes be helpful in detecting a condition due to a weakened component that has not yet completely failed.

Below is a list of scheduled maintenance checks and their periodicity.

Clean external areas:	weekly, or as required
Clean slide shaft:	monthly
Clean service station:	biweekly
Clean encoder strip:	monthly
Clean cartridge dimples:	if prime fails
Clean flex cable contacts:	if prime fails, or cartridge is replaced
Clean and inspect motor gears:	annually
Clean and inspect MPCB:	annually
Clean and inspect carrier assembly:	annually
Reseat connectors on MPCB:	annually
Reseat connectors on carrier board:	annually
Replace carrier bushings:	biannually

Cleaning Procedures



Always turn the printer OFF, remove the power cord and the interface cable before cleaning the printer. An electrical shock hazard may be present if these procedures are not followed.

External Cleaning



Do not use abrasive cleansers of any sort on the surfaces of the printer. Damage to the surface may result.

The exterior surfaces of the printer may be cleaned with a soft cloth which has been dampened. For more persistent stains, a small amount of liquid detergent may be used. Cleaning intervals are determined by the environment in which the printer is used.

Slide Shaft Cleaning



Use only isopropyl alcohol on the slide shaft of the printer. Damage to the stainless steel slide shaft may result if cleaned with water and not completely dried off.

Printer problems can be caused by an accumulation of dirt or other contamination on the slide shaft. This contamination may lead to drag on the carrier. Extreme drag results in a “carrier axis failure” fault and will stop the carrier motion. These problems may be eliminated by maintaining and cleaning the slide shaft at intervals determined by the environmental conditions. **Do not use any lubrication.**

To clean the slide shaft:

1. Turn the printer OFF and remove the power cord.
2. Raise the printer lid.
3. Moisten a clean cloth or paper wipe with isopropyl alcohol.
4. Wipe the length of the slide shaft with the moistened cloth or wipe.
5. Manually move the carrier assembly from side to side.
6. Wipe the shaft again to remove any deposits left from the carrier.
7. Close the cover and reconnect the power cord, turn the printer ON and perform the PRIME plot. Be sure that the carrier moves freely on the slide shaft.

Service Station Cleaning

Ink and dust may build up on the service station, resulting in contamination which may smear the prints. The service station is cleaned as follows:

1. Turn the printer OFF. Disconnect the power cord and interface cable.
2. Raise the printer dust cover.
3. Carefully move the carrier toward the center of the printer.

4. Using a cotton swab dampened with distilled water, wipe the seals and the rubber wiper in the service station until no more ink residue or dust can be removed.
5. With a dry swab, wipe all moisture from the seals and wipers.
6. Close the lid and reconnect the power cord and interface cable.

Linear Encoder Strip Cleaning

Clean the linear encoder strip monthly or as necessary to remove any buildup of debris. Distilled water or isopropyl alcohol may be used. You may notice that it tends to fog the encoder strip; however, no detrimental effect has been observed in the field.

To clean the Encoder Strip:

1. Disconnect the power cord and interface cable.
2. Slightly dampen a cotton swab with distilled water or isopropyl alcohol and wipe along the length of the encoder strip on both sides.
3. Reconnect the power cord and interface cable.

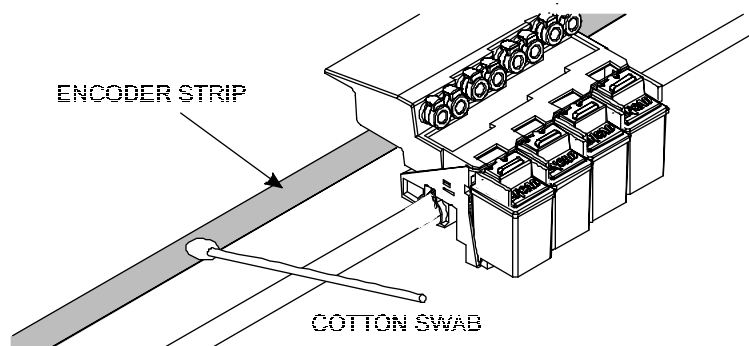


Figure 3-1. Encoder Strip Cleaning.

Cartridge Dimples Cleaning

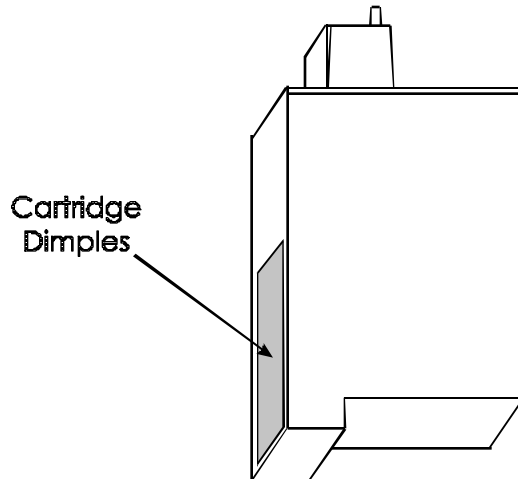


Figure 3-2. Cartridge Dimple Region.

The cartridge dimple area can easily be contaminated by oils and dirt on fingers and hands or ink spilled onto them. This causes the cartridges to not receive some of the electrical signals for a proper firing of the jets. This can be seen as a misfiring of the cartridge.

NOTE

Care should be used when handling the cartridges. Avoid touching the cartridges on the dimple area or on the inkjet holes on the bottom. The oils and dirt on fingers and hands can contaminate the area and result in misfiring of the inkjets.

Clean the cartridge dimple area by gently dabbing the area with a lint free cloth or cotton swab saturated with isopropyl alcohol.

Flex Cable Contact Cleaning

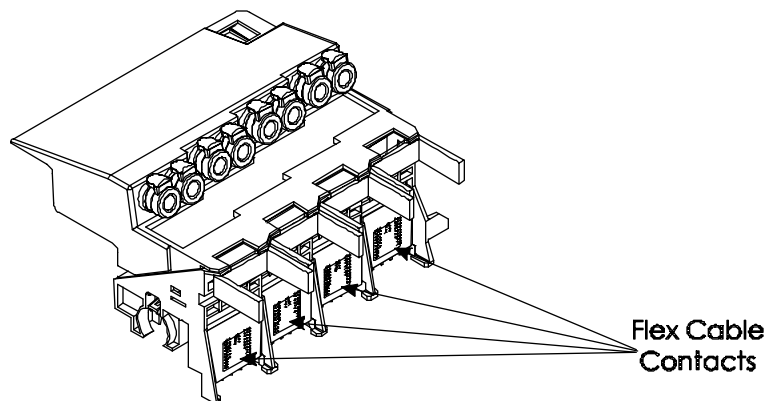


Figure 3-3. Flex Cable Contacts.

Cleaning the flex cable contact area is very important due to the ease of which this area can become dirty. This also causes the cartridges to not receive all of the electrical signals for a proper firing of the jets. This can be seen as a misfiring of the cartridge.

NOTE

Care should be used when handling the flex cable contact area. Avoid touching the contact area because the oils on your skin can contaminate the area and result in misfiring of the inkjets.

Clean the flex cable contacts by gently dabbing the area with a cotton swab soaked with isopropyl alcohol.

Clean and Inspect Stepper Motor Gears

The stepper motor gears can become dirty and after time if not cleaned up, it could cause wide banding in the print. This will

reduce the quality of the intended output. Clean the motor gears with a stiff brush to knock off any debris. A cotton swab soaked isopropyl alcohol can be used to remove any ink that may have accumulated on the gears.

Clean and Inspect MPCB

Foreign material on the MPCB could short out electrical signals being developed on the MPCB and cause erroneous prints or even damage to the MPCB. All electrical circuits should be free of foreign material, especially those with conductive properties.

Clean the MPCB by blowing the objects away or gently brush them aside with a soft brush if required.

Inspect the MPCB for any damage to the board, connections, or any of the components on the board. Replace board if inspection reveals any damage or flaws that could effect the function of the MPCB.

Clean and Inspect Carrier Assembly

Foreign material on the carrier assembly could short out signals being developed on the carrier assembly and cause erroneous prints or even damage to the carrier assembly. A very common problem is where ink has been spilled onto the carrier assembly. All electrical circuits should be free of foreign material, especially those with conductive properties.

Clean the carrier assembly by blowing the objects away or gently brush them aside with a soft brush if required. Be careful not to let anything to fall into the printer as you clean or it could cause a new problem later.

Inspect the carrier assembly for any damage to the boards, connections, or any of the components on the assembly.

Reseat Connectors on MPCB and Carrier Board



Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.



Ribbon connectors can be easily damaged if incorrectly handled. Observe extreme caution when handling the ribbon connectors to avoid damage.

Many problems can be corrected simply by removing and reseating connections found in circuit assemblies. This process helps to clean the contacts and can dissipate any static electrical charges that might have developed.

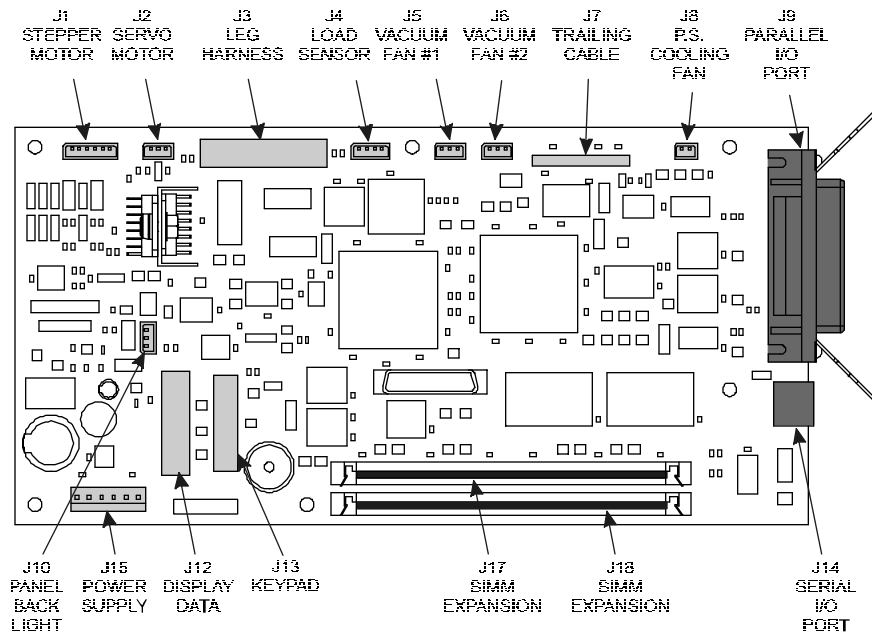


Figure 3-4. MPCB Connection Locations.

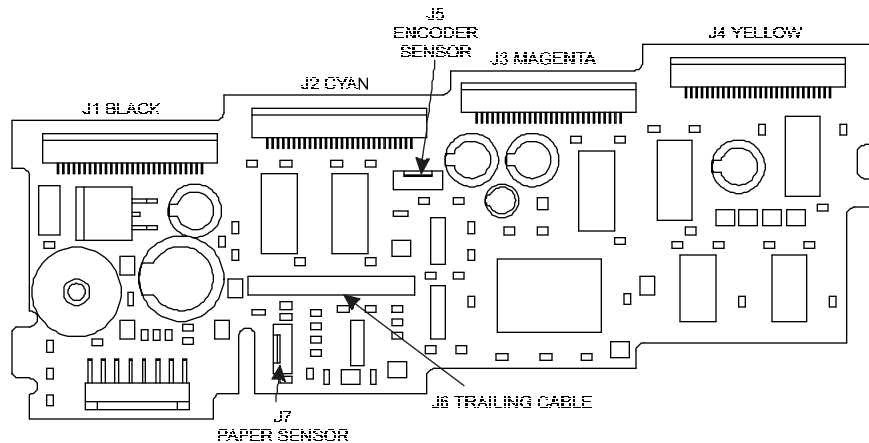


Figure 3-5. Carrier Connection Locations.

Figures 3-4 and 3-5 shows the locations of all the connectors on the MPCB and carrier board respectively. To remove the ribbon cables from their connectors, lift the connector's ribbon locking mechanism as shown in figure 3-6. To reattach, depress the locking mechanism back into the locking position after inserting the ribbon cable end.

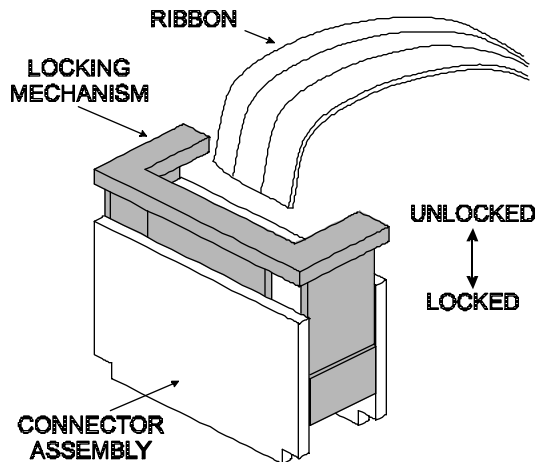


Figure 3-6. Ribbon Connector Locking Mechanism.

Replace Carrier Bushings

The carrier bushings are rated for approximately 1500 hours of operational usage. Many factors including, but not limited to, hours/day used, cleanliness of the slide shaft and general ambient environment make it impossible to calculate the average time that the carrier bushings to last.

If not replaced, the wear on the bushings can result in erratic carrier motion and/or carrier axis failures. It can even cause the cartridge head height to become uneven.

To replace the carrier bushings, follow the procedures for Carrier Bushing Replacement found in Chapter 5.

Servo Motor Winding Resistance Check

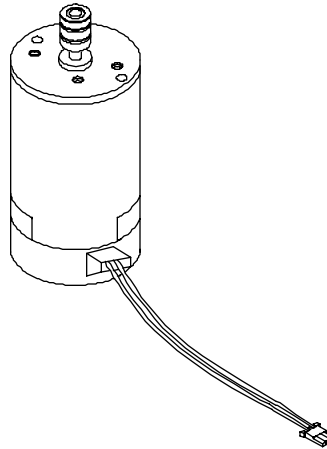


Figure 3-7. Servo Motor.

1. Disconnect the servo motor connection from the MPCB.
2. Using a standard ohmmeter or multimeter, connect the meter leads to the two wires going to the motor.
3. While manually rotating the servo motor, monitor the readings on the meter. The acceptable range is 6-30 ohms. Typically, the reading is 7-11 ohms.
5. If the measurement is found to be unsatisfactory, replace the servo motor.

Stepper Motor Winding Resistance Check

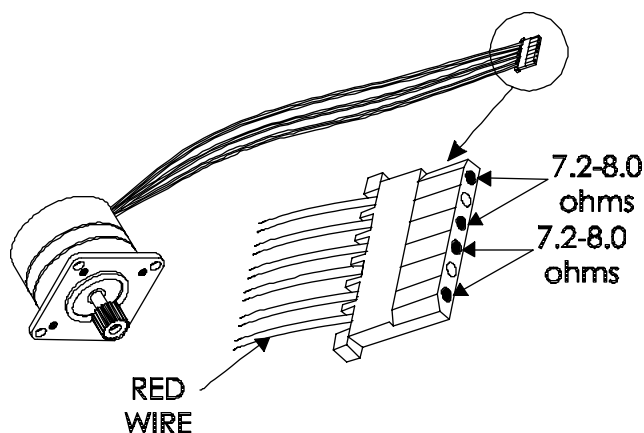


Figure 3-8. Stepper Motor.

1. Disconnect the stepper motor connection from the MPCB.
2. Using a standard ohmmeter or multimeter, measure between pins 1 (red wire) and 3.
3. The reading should indicate 7.2-8.0 ohms.
4. Continue by measuring between pins 4 and 6.
5. Reading should also indicate 7.2-8.0 ohms.
6. If either measurement is out of tolerance, replace the stepper motor.

Power Feed and Take-Up Motor Winding Resistance Check

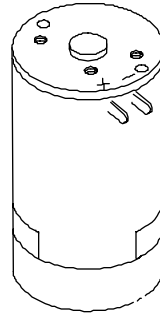


Figure 3-9. Power Feed and Take-Up Motor.

1. Remove the feed and/or take-up roll from the printer.
2. Using Phillips screwdriver, remove the four screws that secure the cradle idler from the right leg.
3. Ease the cradle idler off of the leg enough to disconnect the motor wires from the leg harness.
4. Using a standard ohmmeter or multimeter, measure between the + and - connections on the motor. While manually rotating the servo motor, monitor the readings on the meter. The acceptable range is 25-40 ohms. Typically, the reading is 29-36 ohms.
5. If the measurement is found to be unsatisfactory, replace the motor.
6. Perform the same procedure on the remaining motor.

Banding: Hardware vs Software

The technician must be able to identify whether the banding that is being observed is related to either a hardware or a software problem. The two examples in Figure 3-10 represent classic types of hardware and software banding errors.



Figure 3-10. Examples of Banding.

Hardware banding is usually characterized by consistent banding strips as shown. It signifies a slippage in the media's normal movement that is possibly due to the stepper motor, lower drive shaft assembly, or the rollguides on the back of the printer. All these possible faulty areas deal with a rotational movement that, if faulty, will generate a consistent banding pattern. The MPCB and Carrier PCB can also cause this type of error to incur.

Software banding is characterized by inconsistent banding lines. These banding lines are generated by the software when incorrectly interpreting the paper advancing/ink firing sequence of the expected print file. Because it is not directly tied to a mechanical movement, the bands become inconsistent in both frequency and duration. The possible causes are the printer driver, the original software package, or the RIP, if used. To eliminate the chance that it is the printer driver:

- 1) Remove any RIP or network systems and connect the printer directly to the computer.
- 2) Print a test file approved by **ENCAD** that uses only the printer driver software and the **ENCAD** printer.

If the test file prints correctly, the problem lies in either the software package that generated the print or the RIP, if used.

Alignments/Adjustments

The **ENCAD** Novajet PROe Series printers are designed with a minimum of maintenance requirements in mind. Calibrations include: color calibration, deadband alignment, and X-axis calibration. The mechanical adjustment requirements include the slide shaft profile and cartridge head height adjustments. They do not require any electrical alignments.

Slide Shaft Profile Adjustment

The Novajet PROe series printers Slide Shaft height is factory set to 1.418" (36mm) from the top of the Slide Shaft to the Platen surface. The normal operating range for the height of the Slide Shaft is between 1.390" (35.3mm) to 1.440" (36.6mm). The Slide Shaft is firmly mounted on the outer sides and only has adjustments in the middle portion of the shaft, to remove any bowing of the shaft's profile. The following procedure is to ensure that the Slide Shaft is relatively perpendicular to the surface of the Platen and to remove any bowing that may be present in the shaft's profile.

You will need the following:

- Height Gauge Kit Assembly
- 1/4" open and box end wrench (.110" thick)

Height Gauge (Alignment) Kit Contents are:

Dial Gauge Micrometer	
Measuring Tip, Extension	
Modified Novajet 4/Pro/Pro 50 Cartridge	
Platen/Carrier Shaft Mounting Block	
Extension	- Not used
Calibration Jo Block (1.434")	- Not used
Plastic Gauge Card (0.011")	- Not used
Modified Cadjet (Black) Cartridge	- Not used
Modified Novajet 1,2,3 Cartridge	- Not used

There are two basic measurements that are to be made using this kit (ensure power is off prior to performing these procedures):

1. Slide Shaft Profile Adjustment
2. Carrier (Cartridge) Head Height Setting

1. Connect the dial gauge micrometer to the Shaft mounting block as shown in Figure 3-11.

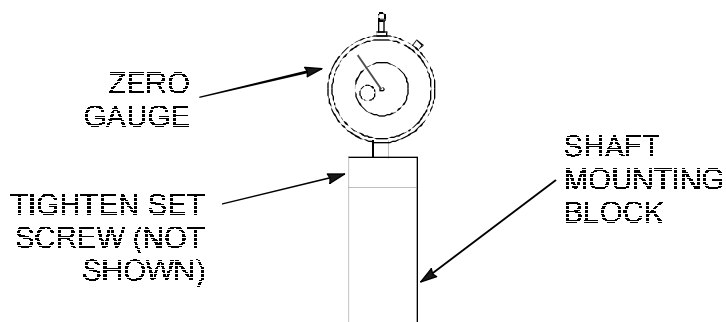


Figure 3-11. Dial Gauge Micrometer Assembly.

2. Place gauge against left side of shaft assembly allowing micrometer tip to rest directly on top of shaft. See Figure 3-12. **Zero the gauge** (this is to become the reference point).

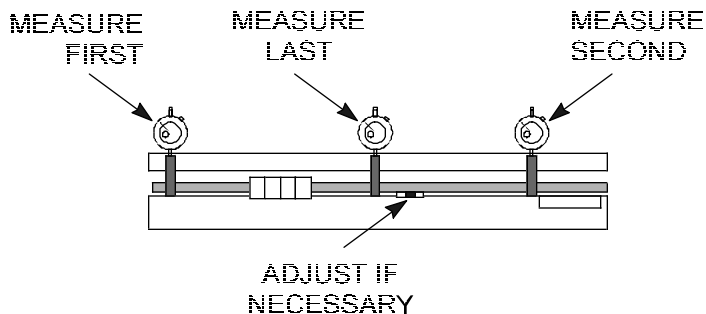


Figure 3-12. Measurement Positions for Slide Shaft.

3. Measure the right side (next to media alignment mark.) and note the difference. Divide this amount by two.

4. Measure just off the center of the slide shaft and adjust the center turnbuckle with an open ended wrench if required, for the average value (the value found in step 3.) See Figure 3-13.

NOTE

The Novajet PRO 60e has two turnbuckles, so these need to be adjusted together for the center position.

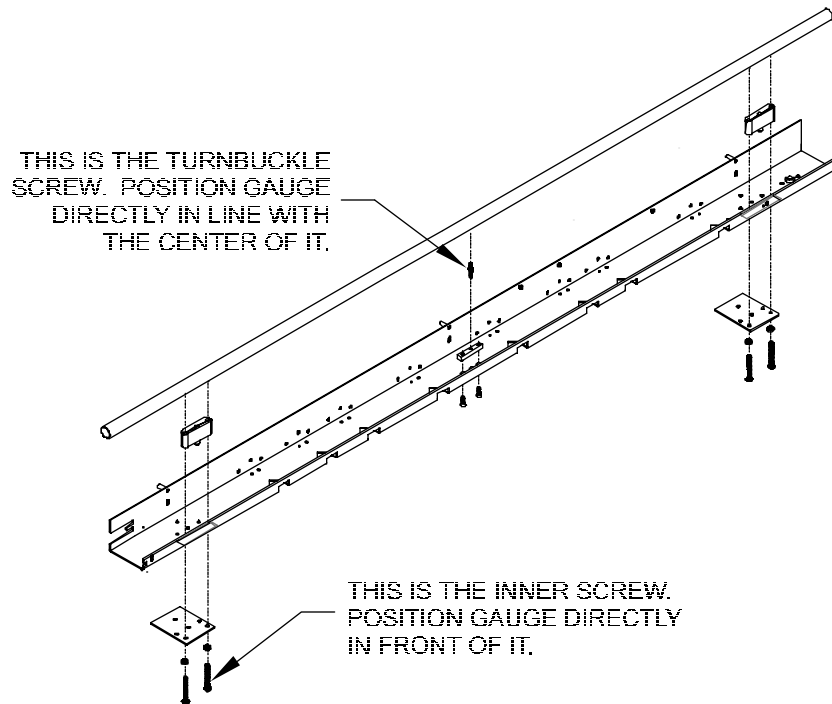


Figure 3-13. Slide Shaft Profile Adjustment.

For example: If the Left = 0, Right = +0.004", then the Center should be adjusted to + 0.002". This will ensure a smooth plane of travel for the carriage assembly. There are no adjustments on either end of the shaft in all models.

Head Height Alignment Procedure

Perform this procedure only when the encoder strip stabilizer has been removed from the Y-Arm or whenever the alignment is in question. The head height alignment procedure is to ensure that a 0.065" +/- 0.003" (0.065" +/- 0.003) difference exists between the cartridge jet plate and the Platen. See Figure 3-14.

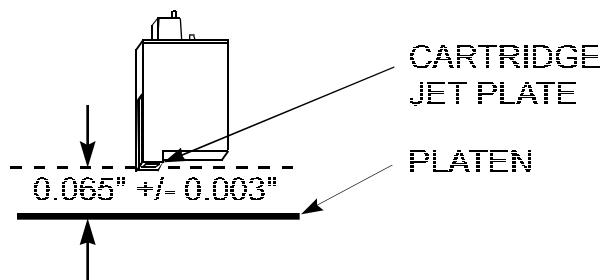


Figure 3-14. Carrier Head Height Tolerance.

1. Remove the lid and the right cover of the printer. See Chapter 5 for procedures.
2. Obtain the 3 tools (Micrometer Dial Gauge, Test Cartridge, and Measuring Tip Extender) from the Height Gauge Kit. Assemble the tools as shown in Figure 3-15.

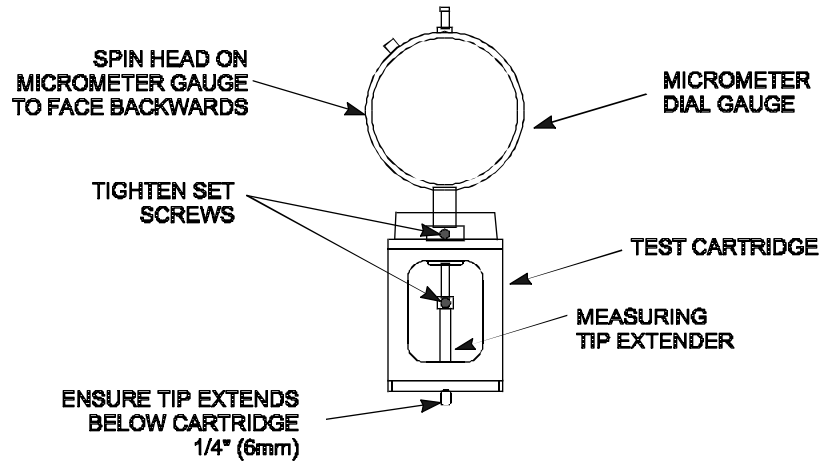


Figure 3-15. Setting Up Tools from Height Gauge Kit.

3. Place the test cartridge upright on a flat surface and 'zero' the gauge by loosening the knob near the top and turning the dial until the needle is at the '0' position on the dial. Tighten the knob. See Figure 3-16.

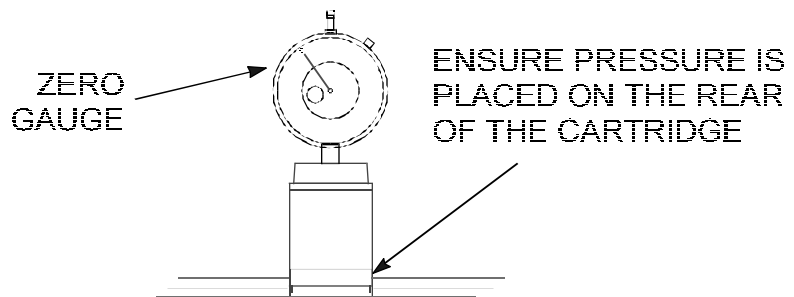


Figure 3-16. Zeroing the Micrometer Gauge.

4. Remove the Cyan ink cartridge. Snap the test cartridge with the micrometer gauge into the position vacated by the Cyan ink cartridge. See Figure 3-17. Ensure that the micrometer can be read from the BACK of the printer.

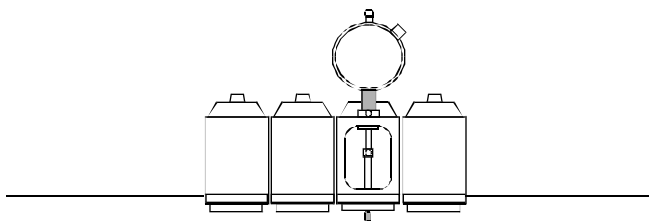


Figure 3-17. Test Cartridge Installed.

5. Slightly loosen the screws located on the back of the Y-arm that secures the stabilizer to the Y-arm.

CAUTION

Damage may occur to the micrometer gauge if the Carrier is moved without lifting up on the measuring tip. This action could also take the micrometer out of alignment and foul the results of the alignment.

6. While lifting up the measuring tip of the micrometer, slide the Carrier to the left side of the stabilizer. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.
7. Move the left end of the stabilizer bracket until a reading of $0.075'' \pm 0.003''$ is observed. Read only the RED numbers on the micrometer gauge.

NOTE

The measurement of 0.075" instead of 0.065" as stated earlier is used due to the fact that the test cartridge does not contain a jet plate assembly. A 0.010" difference had to be added to compensate for the lack of a jet plate assembly on the test cartridge.

8. Tighten the screw on the left side of the stabilizer.
9. While lifting up the measuring tip of the micrometer, slide the Carrier to the right until the next stabilizer screw is lined up. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.
10. Move the left end of the stabilizer bracket until a reading of 0.075" +/- 0.003" is observed. Read only the RED numbers on the micrometer gauge.
11. Tighten the screw on the stabilizer that is next to the Carrier.
12. Continue performing steps 10 through 12 until all four of the stabilizer screws have been adjusted.
13. Reposition the Carrier to all of the adjustment positions and verify that the measurements are correct.
14. Perform steps 6 through 14 as many times as necessary to correctly accomplish this adjustment.

Color Calibration

This procedure describes how to check that the cartridges are properly aligned for color plotting and should be followed each time the ink cartridges are installed. Figure 3-18 is a representation of how a color calibration looks when printed.

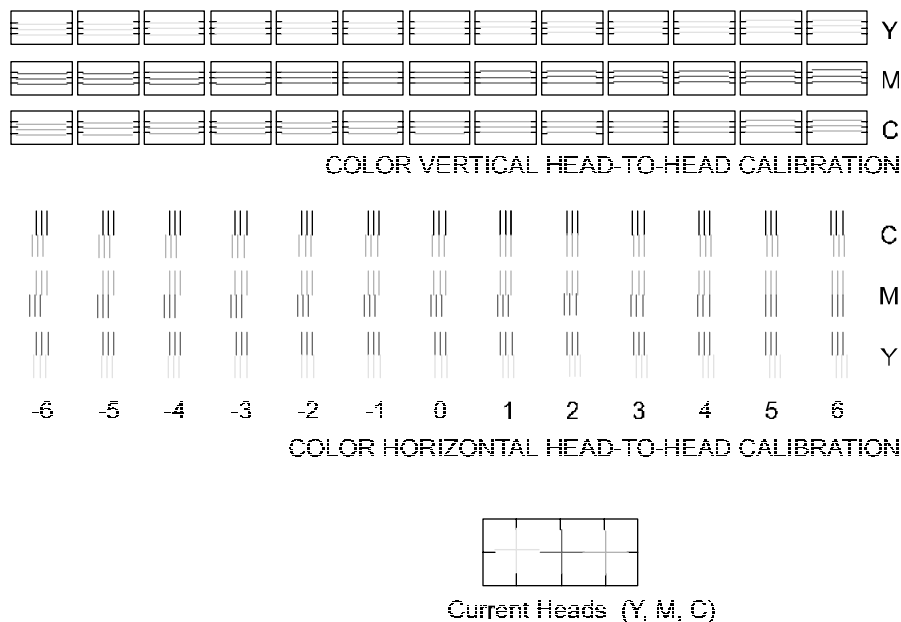


Figure 3-18. Color Calibration.

The “Current Heads (Y, M, C)” view represents the alignment of the heads as they are currently entered. This is just an overview of all heads and how they are aligned. Do not attempt to align the heads using this view.

The “Color Horizontal Head-to-Head Calibration” checks the alignment of the nozzles horizontally and allows corrections when required. Just enter the value below the set of lines that are correctly aligned. Be careful that you are aligning the correct color by observing the C (cyan), M (magenta), and Y (yellow) on the right side of the plot.

The “Color Vertical Head-to-Head Calibration” checks the alignment of the nozzles vertically and allows corrections when required. Just enter the value below the set of lines that are correctly aligned. Be careful that you are aligning the correct color by observing the C (cyan), M (magenta), and Y (yellow) on the right side of the plot.

To perform the Color Calibration:

1. Select "Utility Menu" from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.

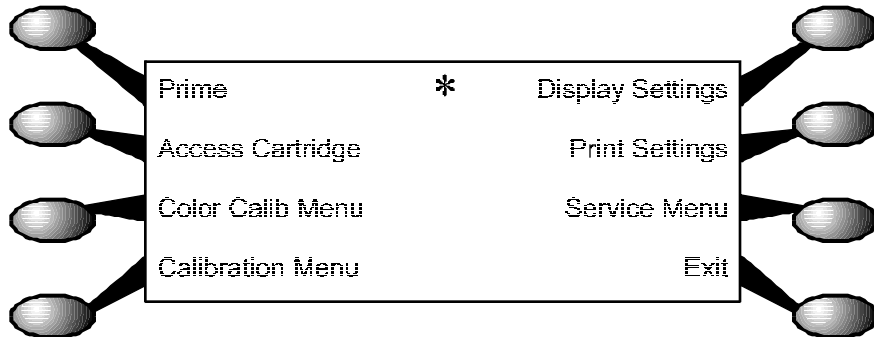


Figure 3-19. Utility Menu.

2. From the Utility Menu, select "Color Calib Menu". This brings up the color calibration menu and it looks like Figure 3-20.

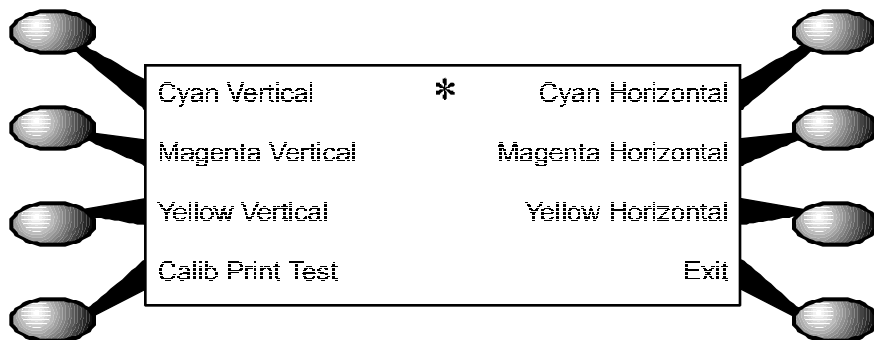


Figure 3-20. Color Calib Menu.

3. Select "Calib Print Test" to print the color calibration plot as shown in Figure 3-18.

4. When the plot is complete, select “Cyan Vertical” at the Color Calib Menu. This brings up the options menu for the cyan vertical adjustment as shown in Figure 3-21.

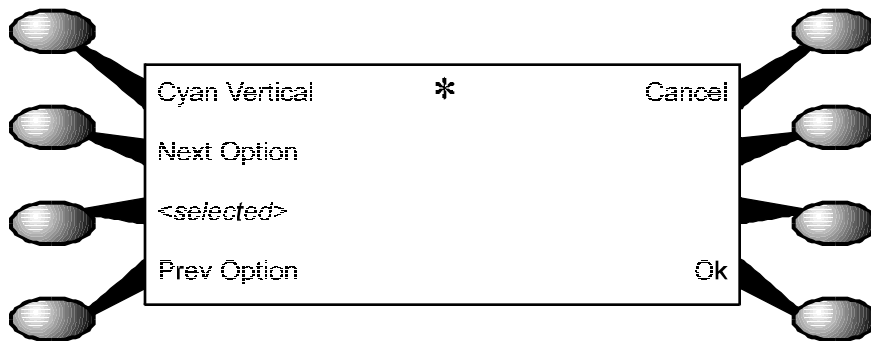


Figure 3-21. Cyan Vertical Options Menu.

5. Observe the plot and using either “Prev Option” or “Next Option”, rotate through the selections until the one that best aligns the cyan color on the plot is selected. Press “Ok” to accept the selection and return to the Color Calib Menu.
6. Continue until all six calibrations on the Color Calib Menu have been accomplished.

Deadband Alignment

Deadband calibration compensates for minute differences created when bidirectional printing is used. Unidirectional printing is not affected by deadband. There are four types of deadband tests:

- slow deadband
- fast deadband
- fast deadband; vertical lines (all)
- fast deadband; vertical lines (one).



Figure 3-22. Deadband Slow/Fast.

Figure 3-22 shows what the display will look like when printing either the fast or slow test if it is out of alignment. A correctly aligned printer will appear as if there is only a series of vertical lines printed. No difference between the top and bottom set of lines to the center set of lines would be apparent.

The SLOW DEADBAND calibration is a precision test that checks the firing time of the jets as related to the forward and reverse direction.

Allowable values for the Slow Deadband is from -2 to 2, and from 0 to 120 for the Fast Deadband.

The Single Line Test and All Line Test are variations of the Slow and Fast Tests except they print longer lines so that long time integration of the deadband calibration can be observed. The Single Line Test prints only one line at a time while the All Line Test prints all lines at the same time.

To perform the Deadband Alignments

1. Select "Utility Menu" from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.
2. Select the "Service Menu" from the Utility Menu. This brings up the Service Menu as shown in Figure 3-23.

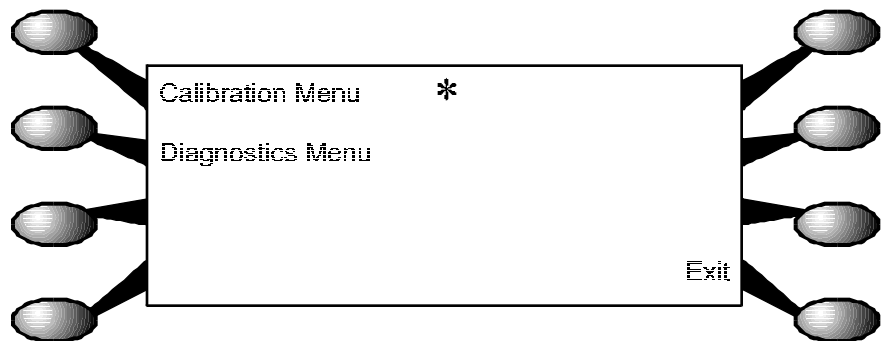


Figure 3-23. Service Menu.

3. Select the “Calibration Menu” from the Service Menu.
4. The Calibration Menu is shown in Figure 3-24 and is where all the deadband tests are performed. Select “Deadband Test” to perform the fast deadband test.

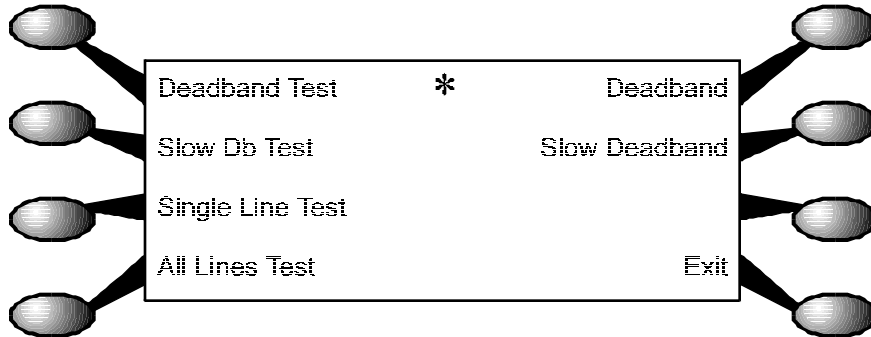


Figure 3-24. Calibration (Deadband) Menu.

5. When the plot is complete, select “Deadband” at the Calibration Menu. This brings up the options menu for the fast deadband adjustment. This menu is similar to the menu depicted in Figure 3-21.

NOTE

The values for the fast deadband adjustment is equivalent to 300 sections per inch. For every incremented value, the print will move 1/300 of an inch. Positive values move the middle segment to the right, while more negative values move the middle segment to the left.

6. Observe the plot and using either “Prev Option” or “Next Option”, rotate through the selections until one that seems closer to the correct value is selected. Press “Ok” to accept the selection and return to the Service Menu.

7. Continue performing steps 4 through 6 until the fast deadband adjustment is correct.
8. At the Calibration Menu, select “Slow Db Test” to run the slow deadband test.
9. When the plot is complete, select “Slow Deadband” at the Service Menu. This brings up the options menu for the slow deadband adjustment. This menu is similiar to the menu depicted in Figure 3-21.
10. Observe the plot and using either “Prev Option” or “Next Option”, rotate through the selections until one that seems closer to the correct value is selected. Press “Ok” to accept the selection and return to the Service Menu.
11. Continue performing steps 8 through 10 until the slow deadband adjustment is correct.

Paper Axis Calibration

The paper axis calibration procedure ensures that the processing that drives the stepper motor is correct to minimize line length accuracy errors.

To perform the paper axis procedure:

1. Select “Utility Menu” from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.
2. From the Utility Menu, select “Calibration Menu”. This brings up the Calibration Menu as shown in Figure 3-25.

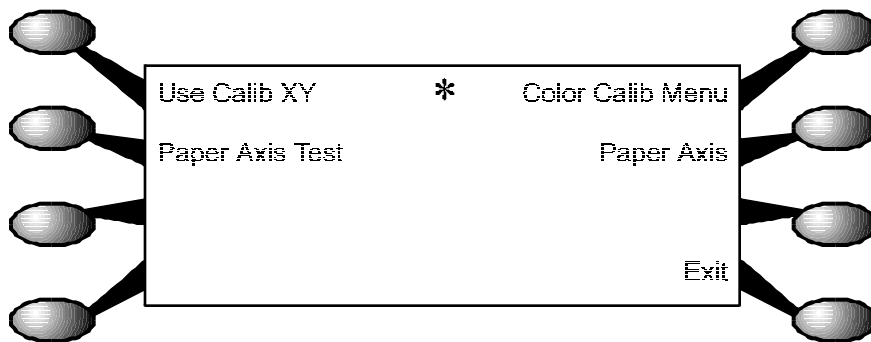


Figure 3-25. Calibration Menu.

3. From the Calibration Menu, select "Paper Axis Test". This runs the paper axis test which prints out two "T" figures that are mirrored from each other and about 33" apart. See Figure 3-26.

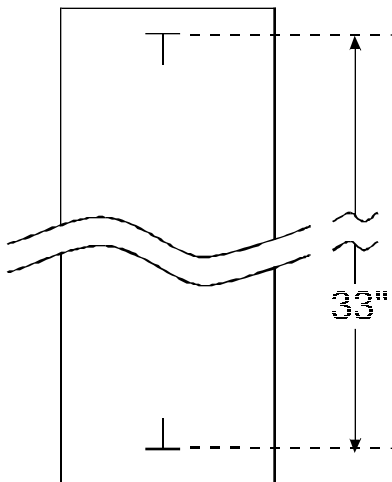


Figure 3-26. Paper Axis Test.

4. With a precision drafters measuring stick, measure the exact distance from each of the “T” intersections.
5. Select “Paper Axis” at the Calibration Menu. This brings up the options menu for the paper axis adjustment. This menu is similar to the menu depicted in Figure 3-21.
6. Using either “Prev Option” or “Next Option”, rotate through the selections until the exact value of the measurement found in step 4 is selected. Press “Ok” to accept the selection and return to the Calibration Menu.

Diagnostics Menu

The Diagnostics Menu is located in the Service Menu (shown in Figure 3-23) and is seen in Figure 3-27.

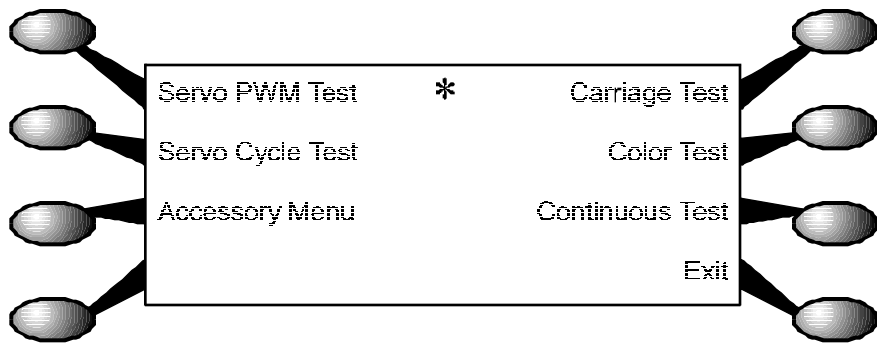


Figure 3-27. Diagnostics Menu.

All tests under the Diagnostics Menu should be performed by competent technicians only. The types of tests that can be performed are: Servo PWM Test, Servo Cycle Test, Carriage Test, Color Test, Continuous Test, Fan #1 Test, Fan #2 Test and Legs Test.

The Fan #1 Test, Fan #2 Test and Legs Test are located in the Accessory Menu as shown in Figure 3-28.

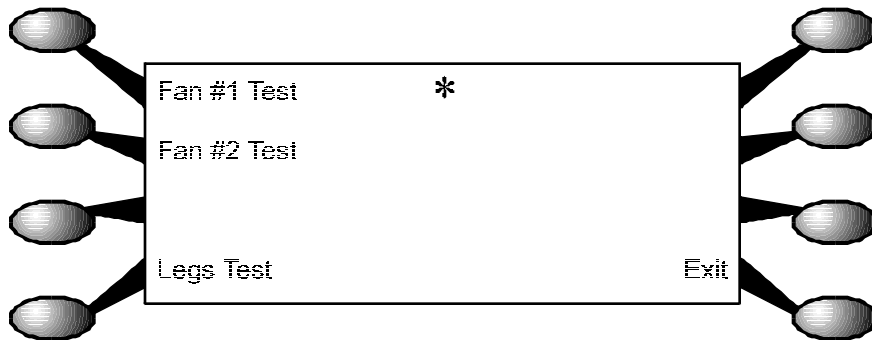


Figure 3-28. Accessory Menu.

Servo PWM Test - Monitors the PWM (pulse width modulation) signal applied to the servo motor from the driver on the MPCB to check the amount of force required to move the Carrier. The test includes three complete cycles of the carrier assembly and lists the average PWM, the maximum PWM, and the position of the carrier where the maximum PWM occurred.

Servo Cycle Test - Tests the servo motor by moving the carrier back and forth across the slide shaft. The number of cycles is selectable and the available options are: 10, 100, 1,000, 10,000, 100,000, 1,000,000.

Carriage Test - Prints 5 sets of 3 parallel lines to test the vibration characteristics of the carrier assembly.

Color Test - The Color Test prints a wide swath of color (total of four) to test for banding. The test is selectable in the amount of ink that is to be printed. The available are: 10%, 25%, 35%, 50%, 65%, 75%, and 100%.

Continuous Test - The Continuous Test sends the printer into a test loop that will perform a series of tests continuously. Powering down and restarting the printer is the only way of exiting this test loop.

The Continuous Test will first prime the cartridges, followed by a serial port test, parallel port test, and a fast deadband display.

The daedband display is used only as a visual inspection of the operating condition of the printer. No adjustments can be performed while in the Continuous Test mode.

A loopback Test Cable is required to correctly accomplish the serial and parallel port tests. Install both ends of the Loopback Cable before running this test. The Loopback Test Cable is listed in Chapter 6.

After completing the deadband display, the test will begin again with the prime and continue until power is removed.

Fan #1 and Fan #2 Tests - Tests the operation of the fans on the printer. Fan #1 Test (while depressed) turns on the power supply cooling fan and the suction fan inside the platen on the right side of the printer. Fan #2 Test (while depressed) turns on the suction fan inside the platen near the center of the printer. The PRO 42e printer does not have this second suction fan, therefore, the Fan #2 Test is disabled.

Legs Test - Tests the condition of the leg harness connections and the components of the power feed and take-up system.

Limited Access Menu

A menu that is not accessible to the operators can be activated in the Service Menu as shown in Figure 3-29. Press the lower left button in the Service Menu to bring up the Code Menu. The code to be entered to bring up the hidden menu is "16753."

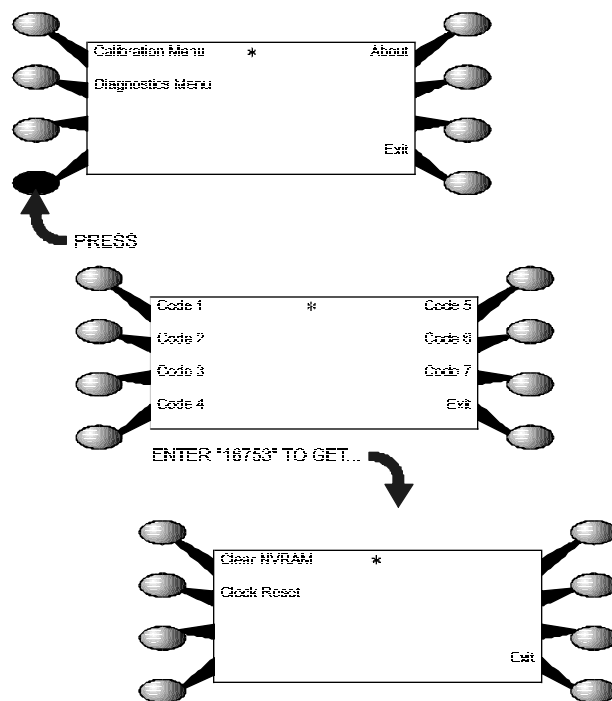


Figure 3-29. NVRAM Clear and Clock Reset Menu.

This menu allows the technician to clear the NVRAM and to reset the system clock.

Clear NVRAM - Clearing the NVRAM is required anytime that a MPCB is to be permanently removed from a printer. The NVRAM is a section of nonvolatile memory that stores printer size information. The MPCB is the identical for both printers but it will have to learn which size printer it is installed in. Clearing the NVRAM allows the MPCB to relearn which size printer it is reinstalled into.

Clock Reset - Resets the system clock to "000." This procedure should only be accomplished when refurbishing a MPCB and installing it into another printer.

Firmware Downloading

The normal method of downloading new firmware is to send the printer a data file of the new code. This requires using an appropriate host utility called “go.exe.” This must be done through the parallel port using a IEEE standard 1284 parallel cable. This method requires code to be running in the printer to interpret the file as it is sent.

If the EEPROM is blank or corrupt so that the printer does not properly initialize (braindead), there is an additional step to download firmware to the printer. This additional step requires a special J Tag Adapter to be placed between the parallel cable and the J16 on the printer's MPCB. It is a required step that allows some registers and DRAM to be written to, allowing a normal firmware reload or upgrade to commence.

To bring the printer out of a braindead condition:

- 1) Remove the Right Cover completely to connect the J Tag Adapter, see Chapter 5 for removal and installation procedures for the Right Cover. See Figure 3-30 for location of J16.

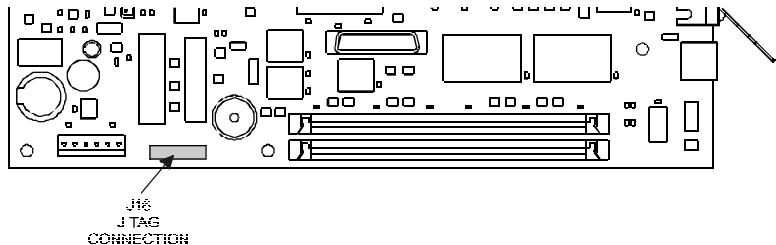


Figure 3-30. J Tag Connection on MPCB.

- 2) After connecting the J Tag Adapter between the parallel port on the computer and J16 on the MPCB, power up the printer.

- 3) At the computer, type "GO ROMIMAGE" from the directory that contains the GO.EXE and ROMIMAGE files.
- 4) In about 15 - 60 seconds, a single beep will be heard from the printer to signify a good transfer of data. If a beep is not heard, cycle the power on the printer and send the file again.
- 5) Turn the printer off, disconnect the J Tag Adapter, and reinstall the Right Cover.
- 6) Turn the printer on and continue with a normal firmware reload or upgrade by connecting the computer to the parallel port and send the firmware file using the GO.EXE. type "GO NJPROExx.ROM" where xx is the version of the firmware.

NOTE

The actual name of the firmware file may change and be different than what is stated above.

Internal Cabling and Signal Flow Diagrams

Figures 3-31 through 3-33 are schematics of the major components and the cabling associated between them. The diagrams depicts component boards or assemblies, jack connections, cables, and signal flow. It is to be used by the technician as an additional aid in troubleshooting and improve understanding of the printers theory of operation.

Figure 3-31 shows all cable connections to the MPCB and the power supply. Figure 3-32 shows all cable connections to the carrier PCB and Figure 3-33 shows all connections of the leg harness assembly.

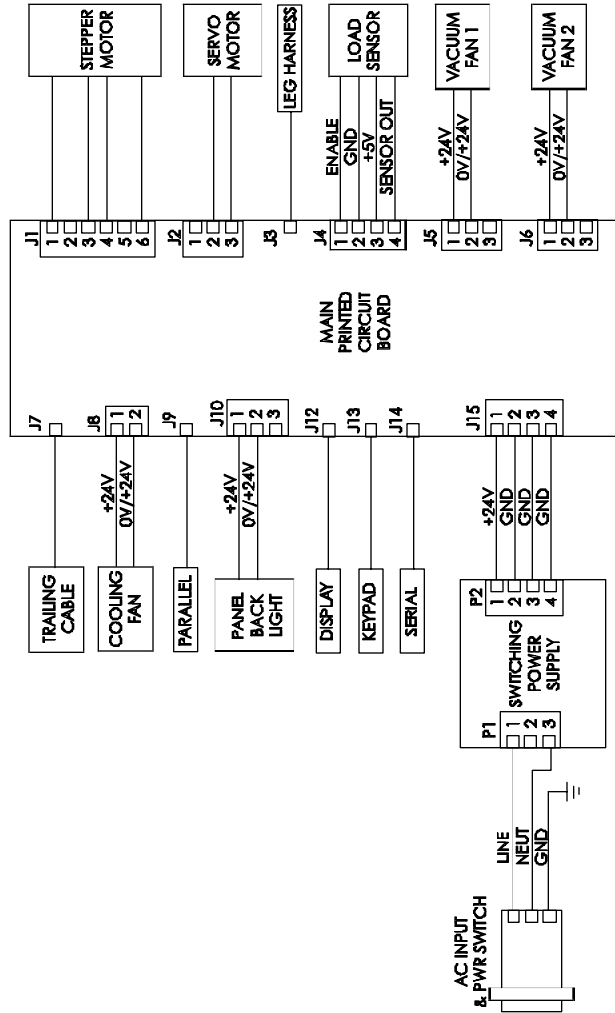


Figure 3-31. MPCB Connections Diagram.

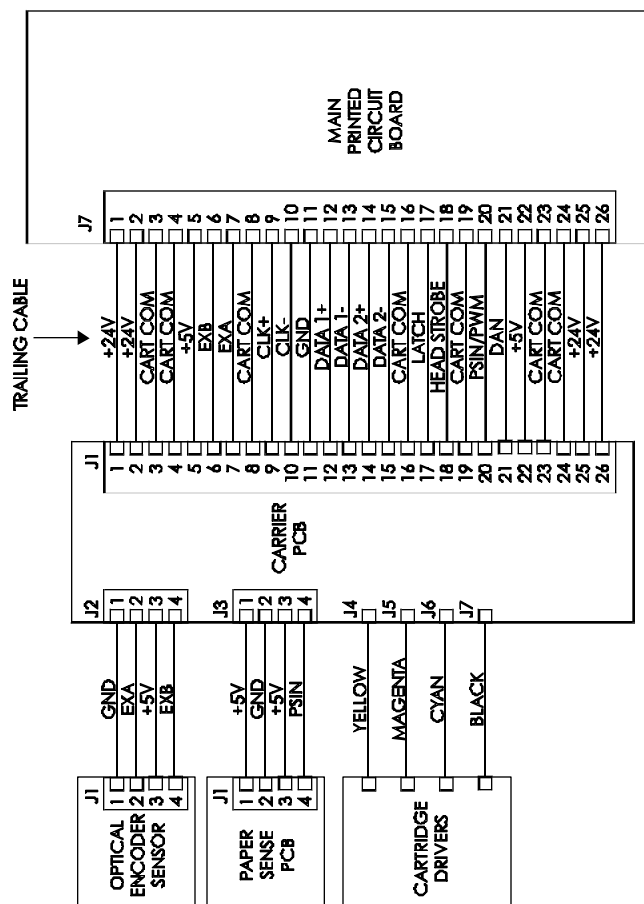


Figure 3-32. Carrier PCB Connections Diagram.

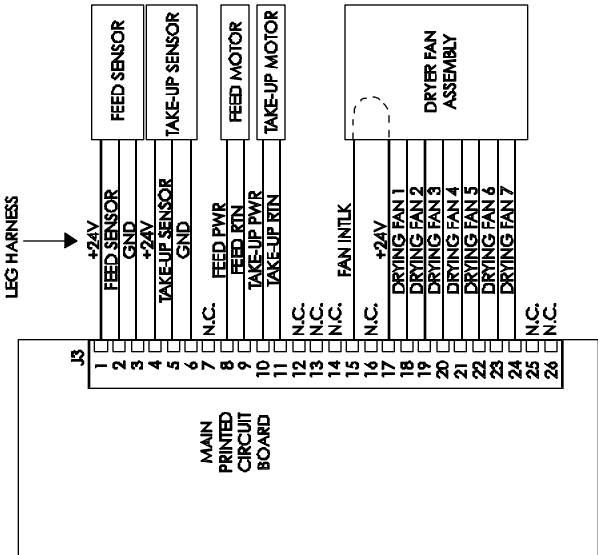


Figure 3-33. Leg Harness Connections Diagram.

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Introduction

Chapter 4, Troubleshooting consists of a table that is intended to aide the technician in troubleshooting the **Novajet PROe** printers. This table addresses symptoms with their possible causes and solutions.

Basic troubleshooting skills will be required to perform the symptom identification, troubleshooting, fault isolation, and repair of the printer when using this table.

Ensure that all applicable software diagnostic tests have been properly executed, all visual indications (including LED status) have been observed, and all applicable pushbuttons have been depressed to obtain a complete list of symptoms to be applied to the table below.

Use the table in conjunction with Chapter 3, Maintenance, whenever the table prompts you for additional information. This information may be in the form of an illustration, additional data, or a procedure that needs to be performed.

Table 4-1. Troubleshooting Table.

Symptoms	Possible cause	Solution
No Power	• printer not ON	depress power switch
	• faulty power cord	replace power cord
	• AC input not present at power supply	replace AC entry module

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
No Power (cont)	<ul style="list-style-type: none">• all DC output voltages not present (see Figure 3-30 for voltages)	replace power supply
Media Does Not Move	<ul style="list-style-type: none">• all DC voltages present at MPCB	replace MPCB
	<ul style="list-style-type: none">• perform Stepper Motor Winding Resistance check	replace stepper motor if out of tolerance
	<ul style="list-style-type: none">• rough motion while spinning stepper motor	bad bearings - replace stepper motor
	<ul style="list-style-type: none">• paper sensor not responding	replace paper sensor
	<ul style="list-style-type: none">• media control switches are operating correctly	driver corrupted - reload printer driver
	<ul style="list-style-type: none">• firmware corrupted	reload firmware
	<ul style="list-style-type: none">• bad MPCB	replace MPCB

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Internal ERROR “Carriage Axis Failure”	<ul style="list-style-type: none">• dirty (or lubricated) slide shaft	perform Slide Shaft Cleaning procedure
	<ul style="list-style-type: none">• perform Servo Motor Winding Resistance check	replace servo motor
	<ul style="list-style-type: none">• check servo motor for smooth movement	bad bearings - replace servo motor
	<ul style="list-style-type: none">• obstruction in path of carrier (may or may not be visible)	remove obstruction
	<ul style="list-style-type: none">• dirty encoder strip	perform Encoder Strip Cleaning procedure
	<ul style="list-style-type: none">• damaged encoder strip	replace encoder strip
	<ul style="list-style-type: none">• bad encoder sensor	replace encoder sensor
	<ul style="list-style-type: none">• worn carrier bushings	replace carrier bushings
	<ul style="list-style-type: none">• loose trailing cable connections	remove power and reseal trailing cable connections at the MPCB and the carrier assembly

TRUBLE-SHOOTING

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Internal ERROR “Carriage Axis Failure” (cont)	<ul style="list-style-type: none"> • cutter assembly malfunction • damaged carrier drive belt system 	replace cutter assembly 1) check idler/tension assembly 2) check carrier belt
Internal ERROR “Encoder Sensor Failure”	<ul style="list-style-type: none"> • encoder sensor cable unseated • bad encoder sensor 	reseal encoder sensor cable replace encoder sensor
Internal ERROR “Paper Sensor Failure”	<ul style="list-style-type: none"> • paper sensor cable unseated • bad paper sensor 	reseal paper sensor cable replace paper sensor
Internal ERROR “Auto-Sensor Failure”	<ul style="list-style-type: none"> • auto-sensor cable unseated • bad auto-sensor 	reseal auto-sensor cable replace auto-sensor

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Internal ERROR “Trailing Cable Failure”	• trailing cable cable unseated	power down and reseat trailing cable
	• bad paper sensor	replace paper sensor
Internal ERROR “MPCB Failure”	• bad MPCB	replace MPCB
Does Not Print	• bad connection between computer and printer	reseat cable connections on computer and printer
	• firmware is corrupted	refresh EEPROM firmware with new download
	• bad MPCB	replace MPCB
Ink Cartridge Misfiring	• cartridge low on ink	refill or replace cartridge
	• firing rate set too fast	adjust firing rate lower (optimum is 5)

TRUBLE-
SHOOTING

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Ink Cartridge Misfiring (cont)	• flex contacts dirty or damaged	1) perform Flex Cable Contact Cleaning procedures 2) replace carrier assembly
	• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure 2) replace cartridge
	• cartridge not seated correctly	reseat cartridge
	• bad cartridge	replace cartridge
	• service station dirty or not properly sealing cartridge jet area	1) perform Service Station Cleaning procedures 2) replace seal on service station
	• bad carrier assembly	replace carrier assembly
	• bad MPCB	replace MPCB

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Paper Skewing	<ul style="list-style-type: none">• paper guides not installed	install paper guides
	<ul style="list-style-type: none">• stepper motor gearing dirty or damaged	perform Clean and Inspect Stepper Motor Gears procedure
Printer Output is Banding	<ul style="list-style-type: none">• if banding is consistent	1) inspect and/or replace stepper motor (perform Stepper Motor Winding Resistance Check) 2) inspect and/or replace stepper motor gears and/or lower roller assembly 3) replace MPCB
	<ul style="list-style-type: none">• check amount of ink in cartridges	replace or refill cartridges
	<ul style="list-style-type: none">• cartridges need to be primed	perform Prime
	<ul style="list-style-type: none">• color calibration required	perform Color Calibration
	<ul style="list-style-type: none">• X-axis calibration required	perform X-axis Calibration

TRUBLE-SHOOTING

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Printer Output is Banding (cont)	<ul style="list-style-type: none">• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure 2) replace cartridge
	<ul style="list-style-type: none">• flex cable contacts dirty or damaged	1) perform Flex Cable Contact Cleaning 2) replace carrier assembly
	<ul style="list-style-type: none">• carrier belt is loose, too tight, worn, or damaged	reinstall, check tension assembly, and/or replace belt
	<ul style="list-style-type: none">• carrier bushings worn or damaged	replace bushings
Keypad Locked-Up or Not Functioning Properly	<ul style="list-style-type: none">• firmware problem	1) reset printer 2) refresh or upgrade firmware
	<ul style="list-style-type: none">• keypad assembly damaged	replace keypad assembly
	<ul style="list-style-type: none">• faulty connection between MPCB and keypad	reseat or replace connector
	<ul style="list-style-type: none">• bad MPCB	replace MPCB

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Noisy Operation	• ink or paper debris in printer	clean printer
	• obstruction in path of carrier	remove obstruction/ clean printer
	• carrier bushings worn	replace carrier bushings
	• debris or obstruction in fan	clean fan assembly
	• drive belt slipping on idler	replace frame tensioner, spring, or idler
	• hardware or assemblies loose	tighten hardware or assemblies
	• carrier height too low	perform Carrier Head Height Adjustment
	• lower drive shaft gears are dirty or misaligned	clean and/or realign lower drive shaft gears
	• noisy servo motor	replace servo motor
	• noisy stepper motor	replace stepper motor

TRUBLE-SHOOTING

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Line Quality Degraded	<ul style="list-style-type: none">• ink cartridges dirty or clogged	clean and prime ink cartridges
	<ul style="list-style-type: none">• cartridge dimple region dirty or damaged	clean or replace cartridge
	<ul style="list-style-type: none">• color calibration needed	perform Color Calibration
	<ul style="list-style-type: none">• deadband calibration needed (in bidirectional printing mode)	perform Deadband Calibration
	<ul style="list-style-type: none">• debris or lubrication on slide shaft	clean slide shaft
	<ul style="list-style-type: none">• leaks or bubbles in ink delivery lines	1) reseal/prime ink delivery lines on both sides 2) replace ink delivery lines
	<ul style="list-style-type: none">• dirty encoder strip	clean encoder strip
	<ul style="list-style-type: none">• carrier bushings worn	replace carrier bushings
	<ul style="list-style-type: none">• drive belt worn	replace drive belt

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Line Quality Degraded (cont)	<ul style="list-style-type: none"> • drive belt slipping on idler 	replace frame tensioner, spring, or idler
Fan Does Not Power Up	<ul style="list-style-type: none"> • vacuum fan not operating 	replace fan assembly
	<ul style="list-style-type: none"> • MPCB has 24 VDC at J3 pins 1-2 	1) reseal connection at MPCB to fan 2) replace fan
	<ul style="list-style-type: none"> • power not being applied to fan 	1) reload firmware 2) replace MPCB
	<ul style="list-style-type: none"> • printer not in Take-Up Mode 	put in Take-Up Mode (under “Supply Type” from “Paper Option Menu”)
Media Take-Up Motor Not Operating, Sensor Works	<ul style="list-style-type: none"> • bad connection to the motor 	reconnect Take-Up motor
	<ul style="list-style-type: none"> • bad Take-Up motor 	Replace Take-Up motor
	<ul style="list-style-type: none"> • faulty wiring leg harness 	reseal or replace leg harness
	<ul style="list-style-type: none"> • bad MPCB 	replace MPCB

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Media Feed Motor Not Operating, Sensor Works	<ul style="list-style-type: none">• bad connection to the motor• bad Feed motor• faulty wiring leg harness• bad MPCB	<p>reconnect Feed motor</p> <p>Replace Feed motor</p> <p>reseat or replace leg harness</p> <p>replace MPCB</p>
Media Feed and Take-Up Motors Not Operating, Both Sensors Working	<ul style="list-style-type: none">• printer is in Sheet Mode	<p>put in Take-Up Mode (to activate both) or Roll Mode (to activate feed motor only), (under “Supply Type” from “Paper Option Menu”)</p>

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Media Feed or Take-Up Sensor(s) Not Operating	<ul style="list-style-type: none">• reflective decal is dirty or blocked• reflective decal missing• sensor not aligned correctly (sensor bracket bent or misaligned)	<p>clean decal and/or clear obstruction</p> <p>replace reflective decal</p> <p>replace or reshape sensor bracket</p>

TROUBLE-
SHOOTING

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Introduction

Chapter 5 contains the procedures for removal and replacement of the *NOVAJET PROe* series printer assemblies and mechanisms. Illustrations are provided for clarity. Steps for each replaceable part may depend on parts already removed in previous disassembly directions. It is recommended that you read through each procedure before beginning the removal and replacement of any assemblies or mechanisms.

The following is a list of tools which are recommended to disassemble and reassemble the printer:

- #1 Phillips Torque Screwdriver
- #2 Phillips Torque Screwdriver
- #1 Slotted Torque Screwdriver
- #2 Slotted Torque Screwdriver
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- #1 Slotted Screwdriver
- #2 Slotted Screwdriver
- Wrench, 1/4"
- Screwdriver, Socket Head, 1/4"
- Wire Cutters
- Needle Nose Pliers
- X-ACTO Knife
- ESD Wrist Strap

The following materials are also required:

- Isopropyl Alcohol
- Cotton Swabs
- Lint Free Cloth or Tissue
- Double Sided Tape (1/16" thick, 3/4" wide)
- Loctite Blackmax, P/N 200172

A Hardware Kit is available for the printers. See Chapter 6 of this manual for the part number.



Always turn the printer OFF, remove the power cord and the interface cable before beginning any disassembly procedures. An electrical shock hazard may be present if these precautions are not followed.

Remove the Left, Top, and Right Covers

Removing the Left Cover allows access to the left side of the Platen for removal of the Carrier Assembly, Carrier Drive Belt, Tension Assembly, and the Cutter Activator. Also located on this side is the ink reservoirs and the Ink Delivery System portion that is connected to the reservoirs. Removal of the Left Cover is a requirement to remove the Lower Roller Assembly and the Vacuum Fan(s) from inside the Platen.

Removing the Right Cover provides access to the Main Printed Circuit Board (MPCB), Display and Keypad circuits, Servo Motor, AC Entry Module and the Power Supply Cooling Fan.

The Top Cover needs to be removed before any of the other covers can be removed. It also gives access to the Carrier Assembly and the Service Station when in the open (up) position and the Carrier is at the Carrier Access position.

To remove the Top Cover:

1. Put the Top Cover in the open position by lifting the front of the Cover to the full upward position.
2. Depress and hold the retracting stop assembly located on the left side of the Top Cover to disengage it from the Left Cover.

3. Lift up on the left side of the Top Cover until it clears the Left Cover while still depressing the retracting stop assembly, then slide the cover to the left to disengage it from the Right Cover.

To remove the Right Cover Assembly:

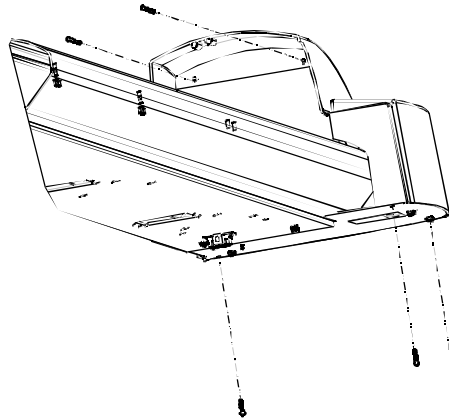


Figure 5-1. Right Cover Assembly Removal/Installation.

4. With a #2 Phillips screwdriver, remove the three screws securing the Right Cover Assembly to the Right Baseplate and the two screws securing it to the Right Sideplate. See Figure 5-1.
5. Reach under the Support Bracket and depress and hold the retracting stop assembly that secures the Right Cover Assembly to the Support Bracket.
6. Carefully lift up on the Right Cover Assembly until it clears the printer enough to gain access to the Keypad, Display, and Backlight connections going to the Main Printed Circuit Board (MPCB).
7. Disconnect the Keypad flex cable connection at the J13 location on the MPCB. See Figure 3-4 for jack locations on the MPCB.
8. Disconnect the Display data ribbon cable connector at the J12 location on the MPCB.

9. Disconnect the Display Power Converter connector at the J10 location on the MPCB. To disconnect, grasp the Display Power Converter connector between thumb and forefinger and pull straight out.

To remove the Left Cover Assembly:

10. Open the reservoir access Door. Disconnect and remove all ink reservoirs.

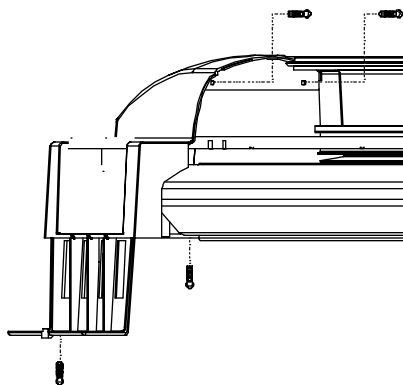


Figure 5-2. Left Cover Assembly Removal/Installation.

11. With a #2 Phillips screwdriver, remove the two screws securing the Left Cover Assembly to the Left Baseplate and the two screws securing it to the Left Sideplate. See Figure 5-2.
12. Reach under the Support Bracket and depress and hold the retracting stop assembly that secures the Left Cover Assembly to the Support Bracket.
13. Carefully lift the Left Cover Assembly up and off the printer.

Install the Left, Top, and Right Covers

To install the Left Cover Assembly:

1. Position the Left Cover Assembly over the Left Baseplate and while depressing the retracting stop assembly on the Support Bracket, lower the Left Cover into position onto the Left Baseplate. Release the retracting stop assembly.



Applying too much torque to the lower screws can cause the mounts for the standoffs on the cover to break, requiring a replacement of the cover.

2. Using a #2 Phillips screwdriver, secure the Left Cover with two screws located on the right side (torque to 15 in-lbs) and two located under the baseplate (torque to 8 in-lbs).
3. Reinstall the ink reservoirs and reservoir door.

To install the Right Cover Assembly:

4. Position and hold the Right Cover Assembly over the Right Baseplate and reconnect the Display Power Converter cable to J10 on the MPCB.
5. Reconnect the Display data ribbon cable to J12 on the MPCB.
6. Reconnect the Keypad flex cable to J13 on the MPCB. Orient the side of the flex cable labeled '1' to pin 1 on the MPCB.
7. While depressing the retracting stop assembly on the Support Bracket, lower the Right Cover Assembly into position onto the Right Baseplate. Release the retracting stop assembly.



Applying too much torque to the lower screws can cause the mounts for the standoffs on the cover to break, requiring a replacement of the cover.

8. Using a #2 Phillips screwdriver, secure the Right Cover with two screws located on the left side (torque to 15 in-lbs) and three located under the baseplate (torque to 8 in-lbs.)

To install the Top Cover:

9. Insert the pin located on the right side of the Top Cover into the corresponding hole on the Right Cover Assembly.
10. While depressing the retracting stop assembly on the left side of the Top Cover, lower the left side of the Top Cover into position and secure it to the Left Cover Assembly by releasing the retracting stop assembly.

Remove the Keypad, Display, and Display Power Converter

1. Perform steps 1 through 9 of the Remove the Left, Top, and Right Covers procedure to remove the Top and Right Covers.

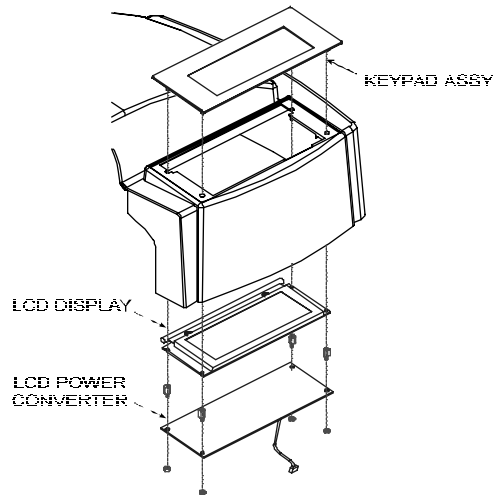


Figure 5-3. Keypad and Display Installation/Removal.

2. Turn the Right Cover Assembly over and disconnect the Display power cable located at J13 from the Display Power Converter. With a 1/4" socket or wrench, remove the four kepnuts securing the Display Power Converter. See Figure 5-3. Remove the Display Power Converter.
3. With a 1/4" socket or wrench, remove the four standoffs that secures the LCD Display Assembly to the Keypad. Remove the Display Assembly.
4. Disconnect the grounding flex cable from the large standoff before removing the Keypad Assembly. See Figure 5-4 for location. Remove the Keypad Assembly.

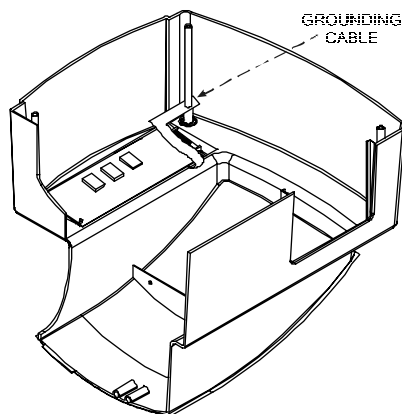


Figure 5-4. Keypad Grounding Connection.

Install the Keypad, Display, and Display Power Converter

1. Route the Keypad flex data and ground cables into the Right Cover Assembly through the hole provided for the Keypad.
2. Place the Keypad into position and hold. Turn the Right Cover Assembly over and position the Display Assembly onto the threaded studs of the Keypad. Secure using four standoffs with a 1/4" socket or wrench.
3. Attach the Keypad grounding flex cable to the cover standoff as shown in Figure 5-4.
4. Secure the Display Power Converter onto the Display standoffs using four kepnuts with a 1/4" socket or wrench. Torque to 6 in-lbs.

Remove Extra Memory (SIMM)

CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Perform steps 1 through 9 of the Remove the Left, Top, and Right Covers procedure to remove the Top and Right Covers.

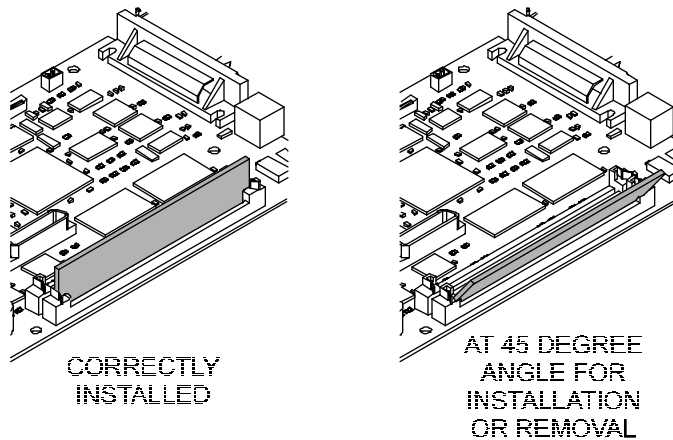


Figure 5-5. Extra Memory (SIMM) Installation/Removal.

2. The SIMM slots are at a 90° angle from the main circuit board. Facing the top of the SIMM, push the side clips gently to the outside (away from the SIMM) then push the top of the SIMM module towards the left side of the printer until the SIMM becomes free of the side clips. Lift up and pull the SIMM out, being careful not to damage the fingers on the top. See Figure 5-5.

Install Extra Memory (SIMM)

NOTE

If you are installing two SIMM, you must install the one located in J17 first. See Figure 3-4 for location.

1. The SIMM slots are at a 90° angle from the board. Place the SIMM at a 45° into the connector as shown in Figure 5-5.
2. Slowly push the SIMM up to a 90° angle until the two side clips snap into place. Make sure the SIMM is fully seated.
3. Perform steps 4 through 10 of the Install the Left, Top, and Right Covers procedure to install the Right and Top Covers.

Remove the MPCB (Main Printed Circuit Board)

CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Perform steps 1 through 9 of the Remove the Left, Top, and Right Covers procedure to remove the Top and Right Covers.
2. Put on an ESD wrist strap.
3. Perform step 2 of the Remove Extra Memory (SIMM) procedure to remove any memory that was added.
4. Disconnect the Power Supply connection at the J15 location by grasping the Power Supply connector with thumb and forefinger and pulling straight out. See Figure 3-4 for jack locations.

5. Disconnect the Stepper Motor connection at the J1 location by grasping the Stepper Motor connector with thumb and forefinger and pulling straight out.
6. Disconnect the Servo Motor connection (red and blue wires) at the J2 location by grasping the Servo Motor connector with thumb and forefinger and pulling straight out.
7. Disconnect the Leg Harness connection at the J3 location by grasping the Leg Harness connector with thumb and forefinger and pulling straight out.
8. Disconnect the Load Sensor connection at the J4 location by grasping the Load Sensor connector with thumb and forefinger and pulling straight out.
9. Disconnect the Vacuum Fan 1 connection at the J5 location by grasping the Vacuum Fan 1 connector with thumb and forefinger and pulling straight out.
10. Disconnect the Vacuum Fan 2 connection at the J6 location (Pro 60e version only) by grasping the Vacuum Fan 2 connector with thumb and forefinger and pulling straight out.
11. Disconnect the Trailing cable connection at the J7 location. Use the thumb and forefinger to pull up on the connector lock and remove the Trailing Cable from the connector.
12. Disconnect the Power Supply Cooling Fan connection at the J8 location by grasping the Power Supply Cooling Fan connector with the thumb and forefinger and pulling straight out.
13. With a #2 Phillips screwdriver, disconnect the ground straps going to the side plate and baseplate by removing the screw located near the parallel port on the MPCB.
14. Using care, remove the MPCB by unscrewing the remaining screws securing the MPCB to the bracket using a #2 Phillips screwdriver. See Figure 5-6.

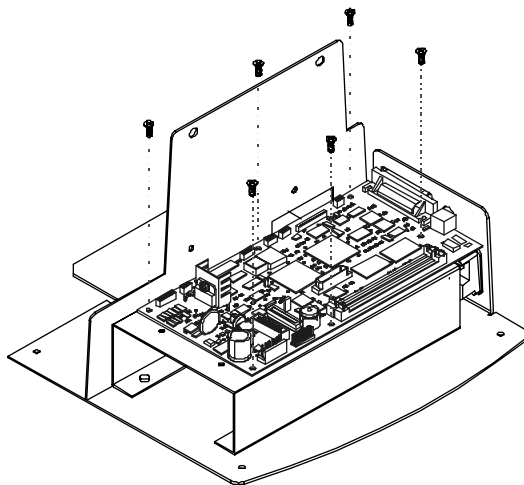


Figure 5-6. MPCB Removal.

CAUTION

Failure to use an approved antistatic bag for storage or shipment may cause damage to the MPCB and affect the Warranty.

15. Place the MPCB in an ESD bag (antistatic bag) in preparation for shipment to **ENCAD** for replacement or repair, or if it is to be stored at your facility for repair.

Install the MPCB



Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Put on an ESD wrist strap.
2. Remove the MPCB from the ESD bag.
3. Align the MPCB so that the serial and parallel connections protrude out of the back of the printer and that the screw holes are aligned to the holes on the power supply bracket.
4. Using a #2 Phillips Torque Screwdriver, fasten the MPCB to the power supply bracket with 8 in-lb of torque. Ensure that the ground straps from the side plate and baseplate are secured to the MPCB by the screw located beside the side plate nearest to the parallel port.
5. Connect the Power Supply Cooling Fan connector to J8 on the MPCB.
6. Connect and lock the Trailing Cable connector to J7 on the MPCB.
7. Connect the Vacuum Fan 2 (PRO 60e only) connector to J6 on the MPCB.
8. Connect the Vacuum Fan 1 connector to J5 on the MPCB.
9. Connect the Load Sensor connector to J4 on the MPCB.
10. Connect the Leg Harness connector to J3 on the MPCB.
11. Connect the Servo Motor connector to J2 on the MPCB.
12. Connect the Stepper Motor connector to J1 on the MPCB.

13. Connect the Power Supply connector to J15 on the MPCB.
14. Reinstall any additional memory into J17 by performing steps 1 and 2 of the Install Extra Memory (SIMM) procedure.
15. Perform steps 4 through 10 of the Install the Left, Top, and Right Covers procedure to install the Right and Top Covers.

Remove Power Supply, Cooling Fan, and AC Entry Module

1. Perform steps 1 through 9 of the Remove the Left, Top, and Right Covers procedure to remove the Top and Right Covers.
2. Perform steps 3 through 15 of the Remove the MPCB (Main Printed Circuit Board) procedure to remove and protect the MPCB.
3. Reach between the Power Supply Bracket and the AC Entry Module and carefully pull out the quick disconnect assembly attaching the Power Supply input to the AC Entry Module. Disconnect the Power Supply input from the AC Entry Module.
4. Disconnect the clip securing the power supply wires to the top of the support bracket.
5. While holding the Power Supply in place, remove the four screws securing it to the Power Supply Bracket. See Figure 5-7.
6. Slide the Power Supply out of the Power Supply Bracket.

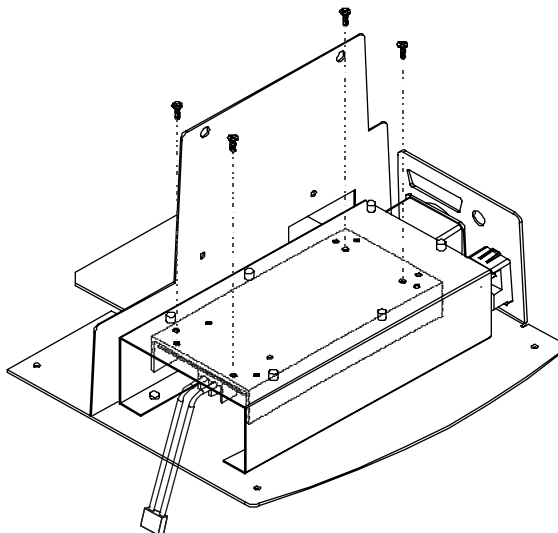


Figure 5-7. Power Supply Removal.

To remove the Cooling Fan and AC Entry Module:

7. Using a #2 Phillips screwdriver, remove the four screws located below the Right Baseplate securing the Power Supply Bracket to the Right Baseplate. Remove the Power Supply Bracket.
8. Using a #1 Phillips screwdriver and a 1/4" wrench or socket, remove the Fan from the Right Baseplate. See Figure 5-8.

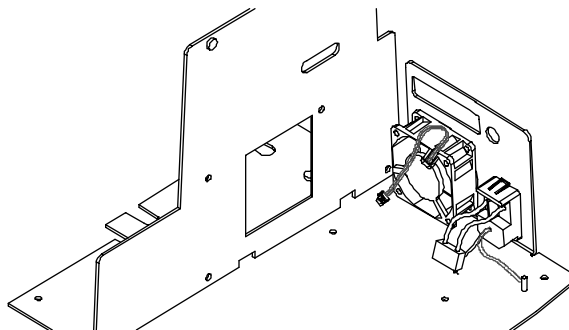


Figure 5-8. Cooling Fan/AC Entry Module Removal.

8. Using a 1/4" wrench or socket, disconnect the AC Entry Module ground from the ground stud on the Right Baseplate.
9. Remove the AC Entry Module by pressing in on the securing tabs until the module is released.

Install the Power Supply, Cooling Fan, and AC Entry Module

To install the Cooling Fan and AC Entry Module:

1. Insert the AC Entry Module into the AC Entry Module hole on the Right Baseplate from the back of the printer. Press in until it snaps securely into place.
2. Attach the AC Entry Module ground connection to the grounding stud on the Right Baseplate.
3. Hold the Cooling Fan into place while inserting the four bolts into the assembly. Attach the four 1/4" nuts to the bolts to secure Fan assembly. Torque to 4 in-lbs.
4. Reinstall the Power Supply Bracket using four screws.
5. Insert and hold the Power Supply into place while securing it with four screws. Torque to 15 in-lbs.

6. Reconnect the Power Supply to the AC Entry Module by reattaching the quick disconnect connection. Push the quick disconnect assembly behind the Power Supply Bracket and out of sight.
7. Perform steps 1 through 14 of the Install the MPCB procedure to install the MPCB.
8. Perform steps 4 through 10 of the Install the Left, Top, and Right Covers procedure to install the Right and Top Covers.

Remove Servo Motor

1. Perform steps 1 through 9 of the Remove the Left, Top, and Right Covers procedure to remove the Top and Right Covers.
2. Perform steps 3 through 13 of the Remove the MPCB (Main Printed Circuit Board) procedure to disconnect all connectors from the MPCB.
3. Reach between the Power Supply Bracket and the AC Entry Module and carefully pull out the quick disconnect assembly attaching the Power Supply input to the AC Entry Module. Disconnect the Power Supply input from the AC Entry Module.

NOTE

The following procedure will leave the MPCB and Power Supply still attached to the Power Supply Bracket. For this procedure there is no reason to remove these assemblies from the Power Supply Bracket.

4. Using a #2 Phillips screwdriver, remove the screw securing the ground strap from the MPCB to the side plate.
5. Using a #2 Phillips screwdriver, remove the four screws securing the Power Supply Bracket to the Right Baseplate. Remove the Power Supply Bracket.

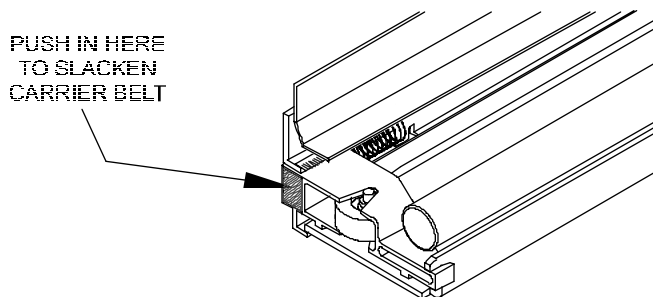


Figure 5-9. Slacken Carrier Belt.

6. Remove the Right Sideplate to gain access to the Servo Motor by unscrewing the four screws securing it to the Platen.
7. Depress the back of the Frame Tensioner (see Figure 5-9) to create slack in the Carrier Belt and slip it off of the Servo Motor pulley.
8. Move the Carrier Belt to the left so it is out of the way of the Servo Motor pulley.
9. Move the Carrier Assembly to the left end of the Slide Shaft.
10. Lift up gently and hold the right end of the Trailing Cable.
11. Using a #2 Phillips screwdriver, remove the back screw on the Servo Motor. The screwdriver will be at a slight angle.

CAUTION

Be careful not to strip the head of the screw or to cause damage to the Encoder Strip.

12. Lower the Trailing Cable back into place.
13. While holding the Servo Motor, remove the front screw on the Servo Motor.

14. Lower the motor to clear the pulley assembly from the platen and carefully bring the motor out of the printer.

Install Servo Motor

1. Reinsert the Servo Motor under the Platen with the connector facing the FRONT side of the Platen. Guide the pulley up through the opening in the Platen.
2. Once the Servo Motor pulley is through the Platen, push up on the Servo Motor and align the screw holes with the screw hole openings.
3. Insert the front screw into the Servo Motor and tighten it almost all the way.
4. Lift up gently and hold the right end of the Trailing Cable.



Make sure the screw does not go into the motor at an angle, and be careful not to strip the head of the screw or to cause damage to the Encoder Strip.

5. Insert the back screw into the Servo Motor and tighten it.
6. Tighten both screws on the Servo Motor to 15 in-lb of torque.
7. Depress the back of the Frame Tensioner and wrap the Carrier Belt over the Servo Motor pulley. Make sure that the guides on the inside of the belt are inserted in the pulley grooves and that the belt is not twisted.
8. Move the Carrier Assembly back and forth to check the Carrier Belt tension.
9. Reinstall the Right Sideplate with four screws and a #2 Phillips screwdriver. Press the side plate down and towards the back of the printer before tightening. Torque to 15 in-lb.

10. Ensure that all cable endings are protruding through the cable access hole in the Right Sideplate.
11. Reinstall the Power Supply Bracket (with assemblies) using four screws.
12. Reconnect the grounding strap from the MPCB to the side plate.
13. Reconnect the Power Supply to the AC Entry Module by reattaching the quick disconnect connection. Push the quick disconnect assembly behind the Power Supply Bracket and out of sight.
14. Perform steps 5 through 13 of the Install the MPCB procedure to reinsert the removed connections from the MPCB.
15. Perform steps 4 through 10 of the Install the Left, Top, and Right Covers procedure to install the Right and Top Covers.

Remove the Ink Delivery System

1. Perform steps 1 through 3 and 10 through 13 of the Remove the Left, Top, and Right Covers procedures to remove the Top and Left Covers.

NOTE

The Foam Chain Shelf being removed in step 2 is only on the PRO 60e printers.

2. Remove the Foam Chain Shelf located inside the rear support bracket.
3. Move the Carrier to the center of the Slide Shaft.

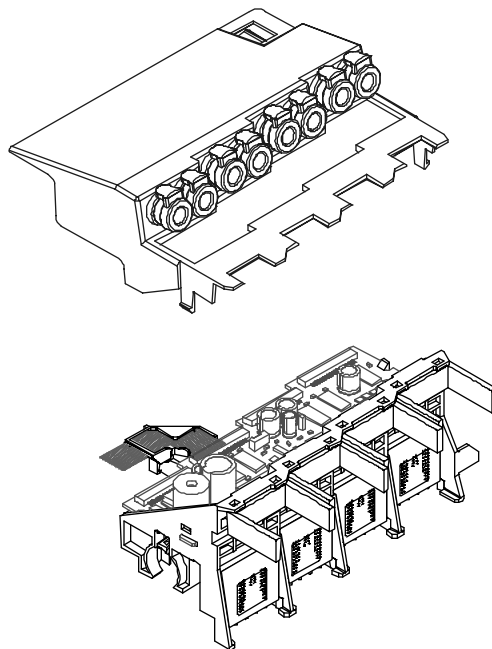


Figure 5-10. Electronics Cover Removal.

4. With a flathead screwdriver, press the Electronics Cover (p/o the Ink Delivery System) tab located in the upper slot on the left side of the Carrier Assembly. See Figure 5-10. Lift up on the front left side of the Electronics Cover until it comes part way off of the Carrier Assembly. Then lift up on the front right side of the Electronics Cover and move the Electronics Cover slightly to the left so that the back of it clears the Back Support Bracket.

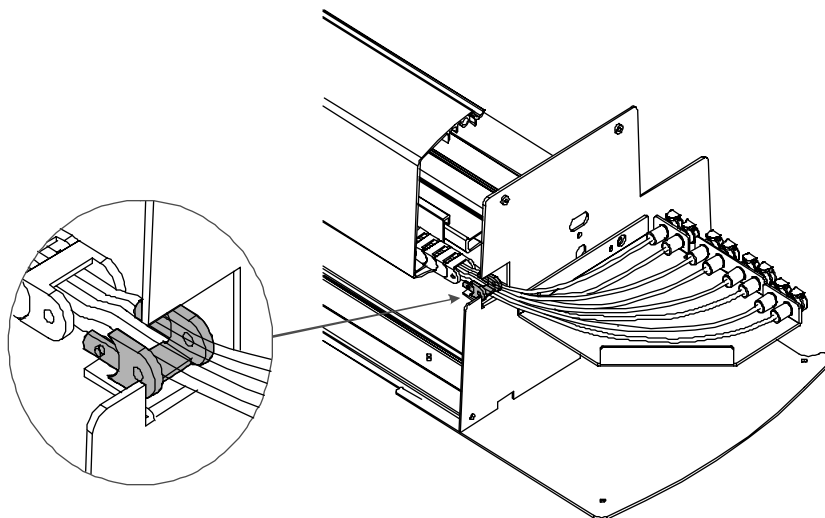


Figure 5-11. Disconnect Ink Delivery System Link.

NOTE

The last link of the Ink Delivery System linkage is a special link and is to remain as part of the Left Sideplate Assembly. It is mounted to the Sideplate Assembly and will not be delivered as part of the Ink Delivery System.

5. Disconnect the last link of the Ink delivery System from the rest of the link assembly by pressing in on the two small posts from the next to last link that are located in the holes of the last link. See Figure 5-11. Releasing one post at a time may be easier to accomplish than trying both at once.
6. Disconnect the Ink Delivery System Bracket from the Left Sideplate using a #2 Phillips screwdriver.
7. Carefully slide the Ink Delivery System out of the printer.

Install the Ink Delivery System

1. Secure the Ink Delivery System Bracket to the Left Sideplate using two screws.
2. Reattach the rest of the Ink Delivery System linkage train to the last link (located on the Left Sideplate).
3. Position the Ink Delivery System into the Support Bracket so that it is easier to orient the Electronics Cover portion of the system over the Carrier for reinstallation.
4. Position the Electronics Cover over the Carrier with the back of the Electronics Cover under the Support Bracket. Depress the two tabs on each side of the Cover and lower the Assembly onto the Carrier until it snaps into place.
5. Place the Foam Chain Shelf in the Support Bracket (PRO 60e only.) Align the left side of the Shelf to the center of the leftmost pinch roller.
6. Perform steps 1 through 3 and 9 and 10 of the Install the Left, Top, and Right Covers procedure to install the Left and Top Covers.

Remove the Carrier Assembly, Carrier Belt, and the Frame Tensioner

1. Perform steps 1 through 13 of the Remove the Left, Top, and Right Covers procedures to remove the Left, Top and Right Covers.
2. Perform steps 2 through 7 of the Remove the Ink Delivery System procedures to remove the Ink Delivery System.
3. Using a #2 Phillips screwdriver, remove the four screws that secures the Left Sideplate Assembly to the Platen. Remove the Left Sideplate Assembly.
4. Lift up on the connector lock to unlock the Trailing Cable connector (J1) on the Carrier PCB and remove the end of the Trailing Cable.

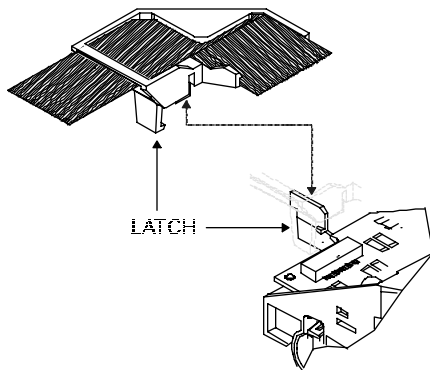


Figure 5-12. Strain Relief Removal/Installation.

5. Remove the Trailing Cable and Strain Relief from the Carrier Assembly by releasing the latch on the left lower side of the Strain Relief and lifting it off of the Carrier Assembly. See Figure 5-12.
6. Compress the back of the Frame Tensioner and use the end of a screwdriver to remove the Carrier Belt from the Servo Motor pulley. See Figure 5-9.
7. Remove the Compression Spring from the Frame Tensioner and set it aside.
8. Push the Carrier Belt through the Frame Tensioner enough to remove the Idler Pulley Assembly from the Frame Tensioner, and then set aside the Idler Pulley Assembly and the Frame Tensioner. See Figure 5-13.

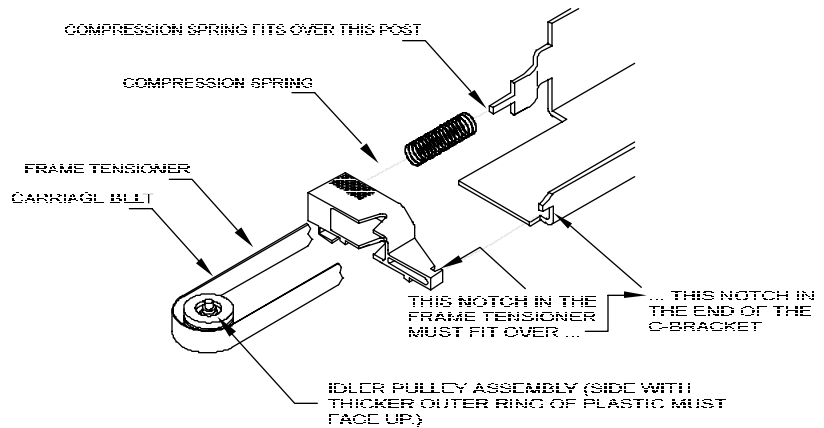


Figure 5-13. Frame Tensioner.

9. Slide the Carrier Assembly and Drive Belt off the left side of the Slide Shaft.
10. Once the Carrier Assembly is removed from the Slide Shaft, turn it over so that you can see the Belt Clamp. See Figure 5-14.

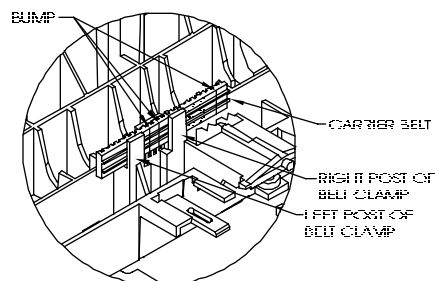


Figure 5-14. Carrier Belt Clamp.

11. To disengage the Carrier Belt from the Belt Clamp, push the Carrier Belt away from the left post of the Belt Clamp and gently lift up until the bottom edge of the Carrier Belt clears the top of the left post.
12. Push the Carrier Belt away from the right post of the Belt Clamp and gently lift up to finish removing the Carrier Belt from the Belt Clamp.



Failure to use an approved antistatic bag for storage or shipment may cause damage to the MPCB and affect the Warranty.

13. Place the Carrier Assembly in an ESD (antistatic) bag in preparation for shipment to **ENCAD** for replacement or repair, or if it is to be stored for repair at your facility.

Install the Carrier Assembly, Carrier Belt, and the Frame Tensioner

1. To install the Belt onto the Carrier Assembly, the “bumps” on the belt (where the ends of the belt are joined together to make the belt continuous) must be positioned between the left and right posts of the Belt Clamp. See Figure 5-14.
2. Slide the Carrier Belt between the right post and the middle post and guide it down into the Belt Clamp. Then slide the Carrier Belt between the left post and the middle post and finish placing the Carrier Belt into the Belt Clamp.
3. Check the position of the Carrier Belt to make sure it matches Figure 5-14.
4. Make sure the left end of the Trailing Cable extends out beyond the left end of the Trailing Cable Support Assembly.

5. Slide the Carrier Assembly onto the left end of the Slide Shaft, making sure that the Encoder Strip fits into the slot in the Slider and the Encoder on the Carrier PCB. Guide the belt while sliding the Carrier Assembly from left to right on the Slide Shaft.
6. Move the Carrier Assembly to the left end of the Slide Shaft and align the left bushing on the Carrier Assembly with the left end of the Slide Shaft.
7. Insert the Strain Relief (with Trailing Cable) onto the Carrier Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place. See Figure 5-13.
8. Place the Trailing Cable into the J1 connector lock on the Carrier PCB. Make sure the silver fingers on the Trailing Cable are fully inserted into the lock and slide both sides of the connector lock shut at the same time.
9. Place the right side of the back of the Electronics Cover under the Trailing Cable Support Assembly and gently press down on the ends of the Electronics Cover until the latches snap into the Carrier Assembly.
10. Slide the Carrier Assembly to about the middle of the Slide Shaft and stretch out the Carrier Belt.
11. Insert the Carrier Belt into the Frame Tensioner so that the belt extends about an inch past the Frame Tensioner.
12. Holding the Carrier Belt and Frame Tensioner, insert the Idler Pulley Assembly into the loop of the belt. Make sure that the side of the Idler Pulley Assembly with the thicker outer ring of plastic is facing up. See Figure 5-13.
13. Once the Idler Pulley Assembly is in position, pinch the belt to hold the Idler Pulley Assembly in place and pull it into the Frame Tensioner so that the axle rests in the V-shaped groove in the Frame Tensioner.
14. Insert the Compression Spring into the opening in the back of the Frame Tensioner so that the end of the spring fits over the post inside the opening.

15. Fit the Compression Spring over the post at the back of the Y-Arm Assembly.
16. Fit the notch in the front end of the Frame Tensioner over the notch in the front of the Y-Arm Assembly.
17. Depress the back of the Frame Tensioner and slip the Carrier Belt over the Servo Motor pulley. Make sure that the guides in the Carrier Belt are properly fitted over the Servo Motor pulley.
18. Gently move the Carrier Assembly from end to end and make sure that the Carrier Belt is not rubbing against any other parts.

Remove the Carrier PCB



Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Removal procedures to remove the Carrier Assembly from the Slide Shaft.
2. Put on an ESD wrist strap.
3. Unlock the connectors and remove all flex cables on the Carrier PCB.

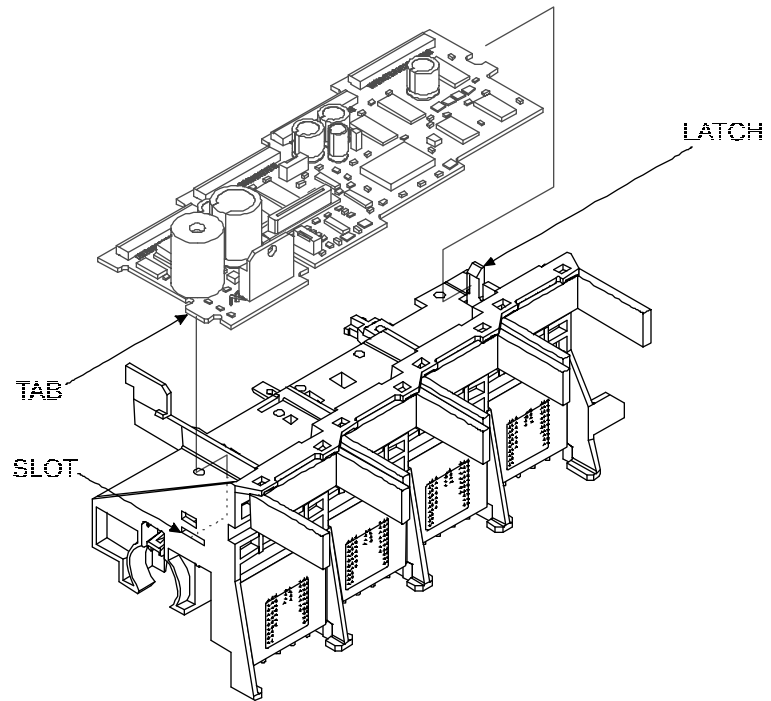


Figure 5-15. Carrier PCB Removal/Installation.

4. Unlock the latch on the right end of the Carrier Assembly and lift up the right end of the Carrier PCB. See Figure 5-15.
5. Slide the Carrier PCB to the right to remove the tab on the left end of the Carrier PCB from the slot in the Carrier Assembly.



Failure to use an approved antistatic bag for storage or shipment may cause damage to the Carrier PCB and affect the Warranty.

6. Place the Carrier PCB in an ESD bag (antistatic bag) in preparation for shipment to **ENCAD** for replacement or repair, or if it is to be stored at your facility for repair.

Install the Carrier PCB

1. Put the tab on the left end of the Carrier PCB into the slot in the left side of the Carrier Assembly. See Figure 5-15.
2. Ensure that no flex cables are underneath the Carrier PCB.
3. Push down the right end of the Carrier PCB until the latch snaps into place.
4. Reattach all flex cables on the Carrier PCB.
5. Perform the Install the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures to reinstall the Carrier Assembly.

Remove the Paper Sensor or the Encoder Sensor

1. Perform the Remove the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures to remove the Carrier Assembly from the Slide Shaft.

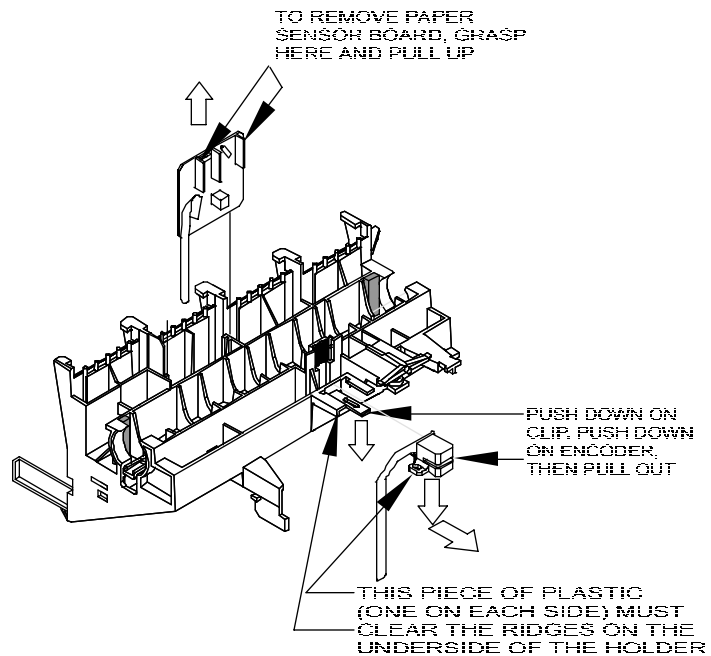


Figure 5-16. Paper and Encoder Sensor Removal.

2. To remove the Paper Sensor:
 - a. Unlock the connector at J3 and remove the flex cable.
 - b. Turn the Carrier Assembly over and hold it while firmly grasping the Paper Sensor between thumb and index finger. See Figure 5-16.
 - c. Pull straight up on the Paper Sensor and remove it from the Carrier Assembly.
3. To remove the Encoder Sensor:
 - a. Unlock the connector at J2 and remove the flex cable.
 - b. Turn the Carrier Assembly over and lay it with the top side facing down.

- c. Push down on the plastic clip and at the same time push down on the Encoder until the plastic pieces on each side of the Encoder clear the ridges which hold it in place. Then pull it straight out. See Figure 5-8.

Install the Paper Sensor or the Encoder Sensor

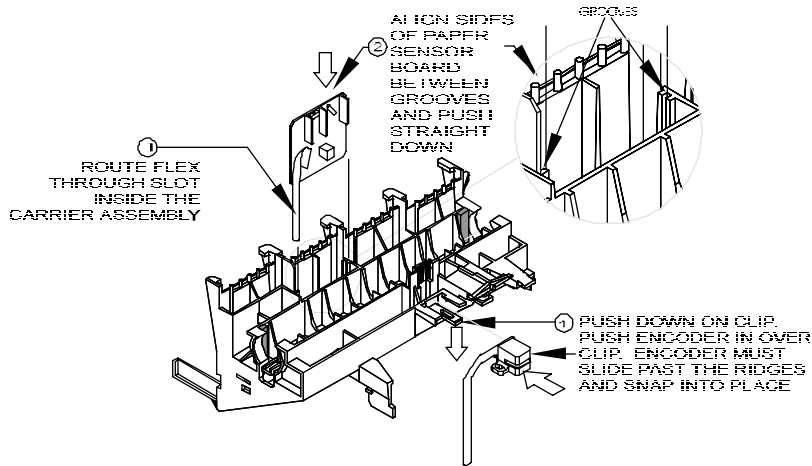


Figure 5-17. Paper and Encoder Sensor Installation.

1. To install the Paper Sensor:
 - a. Turn the Carrier Assembly so that the bottom side of it is facing up.
 - b. Route the flex on the Paper Sensor through the slot in the Carrier Assembly. Make sure the flex cable goes all the way through and does not curl under the Carrier PCB.
 - c. Grasp the Paper Sensor between thumb and index finger and guide the sides of the board into the grooves on each side of the opening. See Figure 5-17.
 - d. Push the Paper Sensor board down into the Carrier Assembly until it snaps firmly into place.
 - e. Turn the Carrier Assembly over and insert the Paper Sensor flex cable into the connector at J3.

-
- f. Push both sides of the connector lock shut at the same time.
 2. To install the Encoder Sensor:
 - a. Turn the Carrier Assembly so that the bottom side of it is facing up.
 - b. Push down on the plastic clip and slide the back of the Encoder Sensor over it.
 - c. Push the Encoder Sensor in past the ridges until the Encoder Sensor snaps into place.
 - d. Turn the Carrier Assembly over and insert the Encoder flex cable into the connector at J2.
 - e. Push both sides of the connector lock shut at the same time.
 3. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Reinstallation procedures to reinstall the Carrier Assembly.

Replacing the Carrier Bushings

1. If there is not enough space on both sides of the Slide Shaft to remove the Carrier bushings, perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Removal procedures to remove the Carrier Assembly from the Slide Shaft.

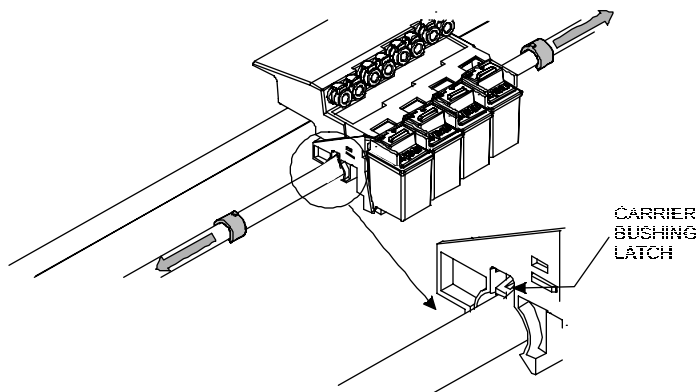


Figure 5-18. Carrier Bushing Removal.

2. Use a flat tip screwdriver to push up on the latch which holds the Carrier Bushing in place. See Figure 5-18.
3. Pull the Carrier Bushing out of the Carrier Assembly.
4. Repeat Steps 2 and 3 for the other Carrier Bushing.

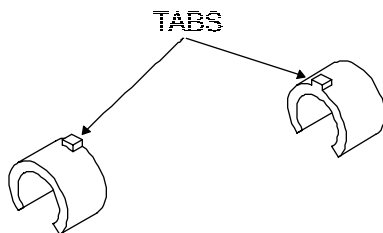


Figure 5-19. Carrier Bushing Installation.

5. Orient the new Bushing as shown in Figure 5-19 so that the metal tab on top of the Bushing goes into the Carrier Assembly first.
6. Push the Bushings in until they snap into place.
7. Perform the Reinstall the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures to reinstall the Carrier Assembly if Carrier was removed.

Remove the Service Station, Seals, and Wipers

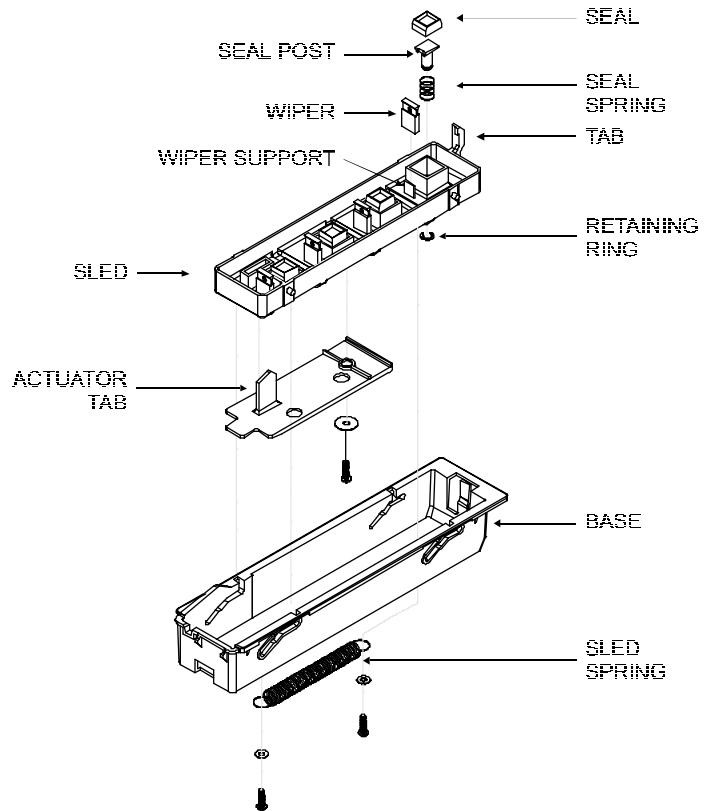


Figure 5-20. Service Station, Exploded View.

1. Place the Top Cover in the open position.
2. Move the Carrier Assembly to the left side of the Slide Shaft.
3. Reach into the Right Cover and pull back on the Service Station release tab located on the far side of the Service Station. See Figure 5-20.

4. Raise the right side of the Service Station out of the Platen.
5. Lift out the left side of the Service Station from the Platen and remove the Service Station. Moving the Service Station farther to the right might be required to release the left side of the Service Station.
6. To remove a Service Station Wiper, lift the Wiper up and off of the Wiper support.
7. To remove a Service Station Seal:
 - a. Disconnect the Sled spring from the post on the bottom of the Service Station Sled. See Figure 5-20.
 - b. Slide the Service Station Sled to the right and up until it is removed from the Service Station Base.
 - c. While pushing the Service Station Seal in, remove the retaining ring from the other side. This releases the Seal Post (with the Seal attached) and the Seal spring.
 - d. Remove the Seal from the Seal Post by sliding the rubber Seal until it is released.

Install the Service Station, Seals, and Wipers

1. To install a Service Station Seal:
 - a. Slide the new Seal over the Seal Post.
 - b. Insert the Seal Post through the Seal spring.
 - c. Align the Seal Post and spring into the hole on the Service Station Sled, it is keyed to only go in one way.
 - d. Press the Seal Post in to give enough clearance on the other side to attach the retaining ring.
 - e. Insert the Service Station Sled into the Service Station Base by sliding the Service Station Sled down and to the left into the Base. To seat the Sled completely into the Base it will be necessary to press down on the tab on the Actuator.

- f. Reattach the spring onto the post on the bottom of the Service Station Sled.
2. To install a Service Station Wiper, press the new Wiper onto the wiper support.
3. Position the Service Station inside the Right Cover and place the left side of the Service Station into the Platen.
4. Push down on the right side of the Service Station until the Service Station snaps into place.
5. Slide the Carrier Assembly to the right and back into the home position.
6. Lower the Top Cover.

Remove the Trailing Cable Assembly

1. Perform steps 1 through 13 of the Remove the Left, Top, and Right Covers procedures to remove the Left, Top and Right Covers.
2. If you have not already removed the Carrier Assembly from the Slide Shaft, you will need to perform Steps 3 through 7 of the Removing the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures in order to remove the Electronics Cover and release the left end of the Trailing Cable from the Carrier PCB.
3. Disconnect the Trailing Cable Assembly connector at the J6 location on the MPCB. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cable from the connector. See Figure 3-6 if necessary.
4. The Trailing Cable Assembly is secured to the Stabilizer Bracket by two pieces of double sided tape. Remove the Trailing Cable Assembly from the Stabilizer Bracket.
5. Remove the ferrite and the tape securing it to the Trailing Cable.

Install the Trailing Cable Assembly

1. Apply two new pieces of double sided tape to the Stabilizer Bracket. Ensure that the tape is in the same location as the original tape was.



The right side of the Trailing Cable (the side connected to the MPCB) must extend beyond the Stabilizer Bracket by 5" (4 7/8" - 5 1/8") or 128mm (125mm - 131mm.)

2. Slip the ferrite around the Trailing Cable and insert the right side of the Trailing Cable Assembly through the access hole provided in the Right Side plate.
3. Slide the Carrier Assembly (if installed) to the far left side of the Slide Shaft. While ensuring a 5" (125mm) overhang on the right side, position the Trailing Cable over the Stabilizer Bracket and slowly lower it onto the bracket. Ensure that the Trailing Cable goes on straight and that there are no buckles in the cable. Firmly press the Trailing Cable Assembly onto the tape to secure it into position.
4. Connect the right end to the MPCB at the J6 location.
5. Tape the ferrite to the Trailing Cable approximately 1/4" (6mm) from the left side of the side plate.
6. If the Carrier Assembly is not installed, perform steps 5 through 18 of the Install the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures.

7. If the Carrier Assembly is installed, insert the Trailing Cable Assembly into the Strain Relief Assembly. Insert the Strain Relief (with Trailing Cable) onto the Carrier Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place. See Figure 5-4.

Remove the Stabilizer Bracket and Encoder Strip

1. Perform steps 1 through 13 of the Remove the Left, Top, and Right Covers procedures to remove the Left, Top and Right Covers.
2. Perform steps 2 through 6 of the Remove the Ink Delivery System procedures to remove the Ink Delivery System.
3. Perform the Remove the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures to remove the Carrier Assembly from the Slide Shaft.
4. Perform steps 3 and 4 of the Remove the Trailing Cable Assembly procedures to remove the Trailing Cable Assembly.
5. Remove the Support Bracket by slightly tilting the top of the Support Bracket towards the front of the printer and lifting it straight up. See Figure 5-21.

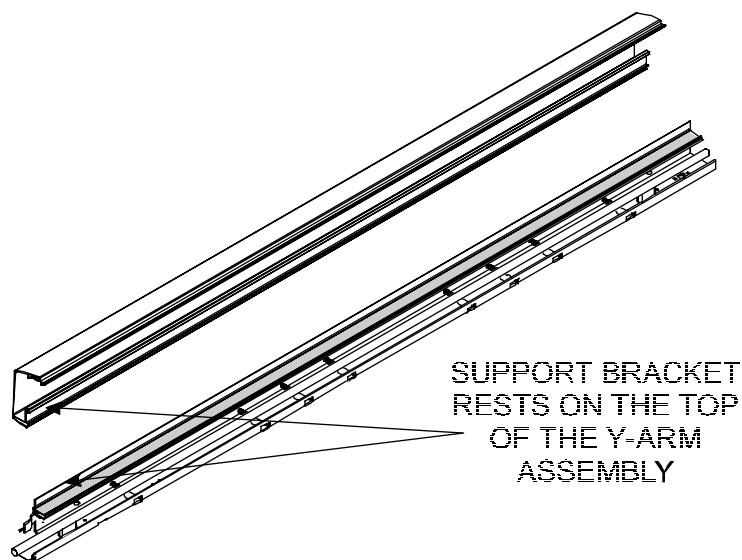


Figure 5-21. Stabilizer Bracket Installation/Removal.

6. Remove the Stabilizer Bracket from the Y-Arm Assembly by removing the four alignment Allen screws and washers located on the back of the Y-Arm Assembly.

CAUTION

The Encoder Strip is not a field removable item. The entire Stabilizer Bracket Assembly with the Encoder Strip and Trailing Cable installed is to be replaced if the Encoder Strip is damaged.

Install the Stabilizer Bracket and Encoder Strip

1. Install the Stabilizer Bracket Assembly (with Encoder Strip and Trailing Cable) onto the Y-Arm Assembly using the four alignment Allen screws and washers. Hand tighten only.
2. Install the Support Bracket onto the Stabilizer Bracket Assembly by placing the Support Bracket onto the Stabilizer Bracket with a slight forward tilt.
3. Perform the Install the Carrier Assembly, Carrier Belt, and the Frame Tensioner Procedures to install the Carrier Assembly, Carrier Belt, and the Frame Tensioner.
4. Perform steps 2 through 7 of the Install the Trailing Cable Assembly procedures to finish installing the Trailing Cable Assembly.
5. Perform the Install the Ink Delivery System procedures to install the Ink Delivery System.
6. Perform the Install the Left, Top, and Right Covers procedures to install the Left, Top and Right Covers.
7. Perform the Head Height Adjustment procedures found in Chapter 3 of this service manual.

Remove the Y-Arm Assembly, Pinch Rollers, Slide Shaft, and Auto-Load Sensor

1. Perform steps 1 through 13 of the Remove the Left, Top, and Right Covers procedures to remove the Left, Top and Right Covers.
2. Perform steps 2 through 6 of the Remove the Ink Delivery System procedures to remove the Ink Delivery System.
3. Perform the Remove the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures to remove the Carrier Assembly from the Slide Shaft.

4. Perform steps 3 and 4 of the Remove the Trailing Cable Assembly procedures to remove the Trailing Cable Assembly.
5. Perform steps 5 and 6 of the Remove the Stabilizer Bracket and Encoder Strip procedures to remove the Stabilizer Bracket Assembly.
6. Disconnect the Load Sensor connector at the J4 location on the MPCB. Grasp the Load Sensor connector with the thumb and forefinger and pull straight out.
7. Remove the seven screws that secures the Y-Arm Assembly to the Platen. See Figure 5-22.

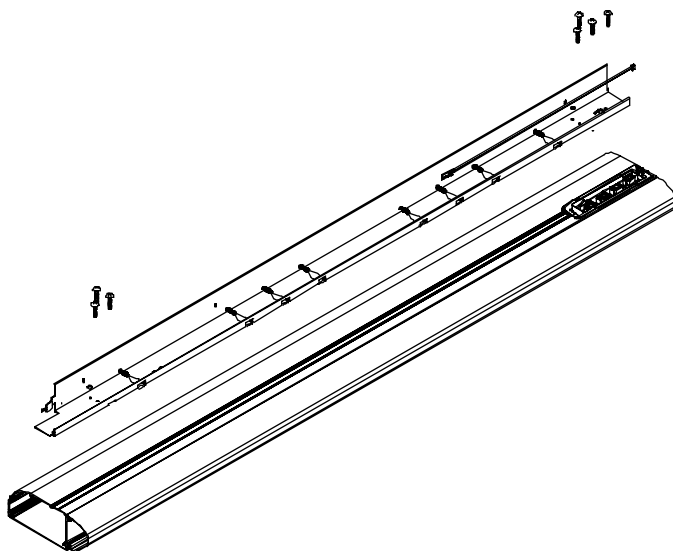


Figure 5-22. Y-Arm Installation/Removal.

8. The pinch rollers are held on by a small C clamp located on the back of the Y-Arm Assembly. See Figure 5-23. While holding the pinch roller, remove the C clamp and move the pinch roller towards the front of the Y-Arm Assembly until it clears the back of the Y-Arm Bracket.

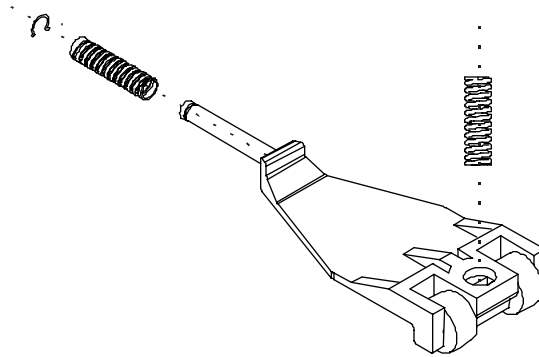


Figure 5-23. Pinch Roller.

9. Spin the back of the pinch roller to either side and remove the back spring.
10. Carefully tilt the back of the pinch roller upwards. This brings the front of the pinch roller down, away from the Slide Shaft. Carefully remove the spring that is going into the Slide Shaft from the top of the pinch roller.
11. Remove the pinch roller.
12. From the bottom of the Y-Arm Assembly, remove the four screws that secure the Slide Shaft and its two supports from the Y-Arm Assembly.
13. Using a #1 Phillips screwdriver, remove the two screws that secure the Auto-Load Sensor to the Y-Arm. Remove the Auto-Load Sensor wires from the four wire clamps on the back part of the Y-Arm Bracket.

Install the Y-Arm Assembly, Pinch Rollers, Slide Shaft, and Auto-Load Sensor

1. Install the Auto-Load Sensor Assembly into the back part of the Y-Arm Bracket using a #1 Phillips screwdriver. Torque to 6 in-lbs.

2. Route the Load Sensor wires through the four wire clamps on the back part of the Y-Arm Bracket.
3. Install the Slide Shaft and two supports to the Y-Arm Assembly using four screws. Torque to 8 in-lbs.
4. Insert the back compression spring onto the shaft of the pinch roller and push the back of the shaft through the back of the Y-Arm Assembly. Install the C clamp around the shaft of the pinch roller.
5. While compressing the forward pinch roller spring with a screwdriver (or other flat object), position the pinch roller onto the Y-Arm Assembly until the forward spring is located under the hole in the Slide Shaft. Release the spring and verify that the spring enters the hole in the Slide Shaft and that no kinks are present in the spring.
6. Perform steps 4 and 5 for all pinch rollers.
7. Using a #2 Phillips screwdriver, secure the Y-Arm Assembly to the Platen using seven screws. Torque to 15 in-lbs.
8. Perform the Install the Stabilizer Bracket and Encoder Strip procedures to install the Stabilizer Bracket and Encoder Strip.
9. Perform the Install the Carrier Assembly, Carrier Belt, and the Frame Tensioner Procedures to install the Carrier Assembly, Carrier Belt, and the Frame Tensioner.
10. Perform the Install the Trailing Cable Assembly procedures to install the Trailing Cable Assembly.
11. Perform the Install the Ink Delivery System procedures to install the Ink Delivery System.
12. Perform the Install the Left, Top, and Right Covers procedures to install the Left, Top and Right Covers.
13. Perform the Head Height Adjustment procedures found in Chapter 3 of this service manual.

Remove the Lower Roller Assembly, Stepper Motor and Vacuum Fan

The Inner Platen contains the Lower Drive Roller Assembly, the Vacuum Fan Assembly, the Stepper Motor Assembly, Drive Shaft Supports, and the Foam Block. These parts are collectively referred to as the Inner Platen Parts.

NOTE

The removal of the Lower Drive Roller Assembly and Vacuum Fan(s) is easier if extracted out of the left side of the Platen.

1. Perform steps 1 through 13 of the Remove the Left, Top, and Right Covers procedures to remove the Left, Top and Right Covers.
2. Perform steps 2 through 4 of the Remove Servo Motor procedures to remove the Right Sideplate Assembly.
3. Perform steps 2 through 5 of the Remove Service Station procedures to remove the Service Station.

CAUTION

Be careful when removing the Foam Block so that it does not tear. It is very important to have an intact Foam Block to produce sufficient vacuum inside the Platen to properly hold down the media.

4. Using the accesses gained by removing the Right Sideplate and the Service Station, remove the foam block from between the Lower Drive Roller Assembly and the Servo Motor.
5. Perform steps 2 through 6 of the Remove the Ink Delivery

System procedures to remove the Ink Delivery System.

6. Using a #2 Phillips screwdriver, remove the two screws that secure the Left Sideplate Assembly to the Platen. See Figure 5-24.

NOTE

The Novajet PRO 42e printer has one Vacuum Fan and Exhaust assembly while the 60e has two sets of Vacuum Fans and Exhausts.

7. Using a #1 Phillips screwdriver, remove the four screws on the bottom of the Platen which holds the Fan Exhaust(s) in place.
8. While holding the Vacuum Fan through the hole left when the Exhaust assembly was removed, remove the 3 screws on the bottom of the Platen that holds the Vacuum Fan in place using a #2 Phillips screwdriver. Do not allow the screws to come out at an angle.

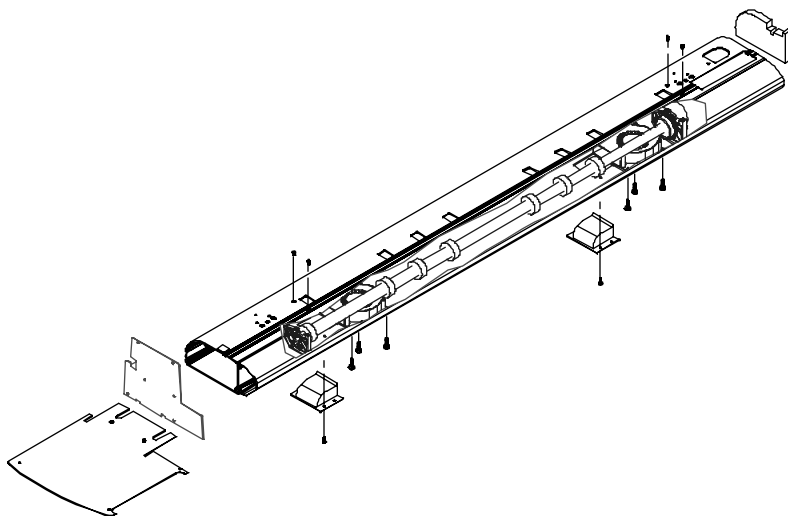


Figure 5-24. Inner Platen Assembly/Disassembly.

9. Using a #1 Phillips screwdriver, remove the black flat-head screws from the top of the Platen that holds the left and right Drive Shaft Supports in place.

CAUTION

It may be necessary to loosen (do not remove) the screws that secure the Y-Arm Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen when removing the Lower Drive Roller Assembly.

CAUTION

It may be necessary to loosen (do not remove) the screws that secure the left Leg Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen when removing the Lower Drive Roller Assembly.

CAUTION

The Fan Assemblies will be removed at the same time that the Lower Drive Roller Assembly is removed. Exercise extreme care that the fan assemblies do not drop out of the Platen when removing the Lower Drive Roller Assembly.

10. Carefully slide the Lower Drive Roller Assembly (and the Fan Assemblies) out of the left side of the Platen.

11. Remove the Stepper Motor Extension Spring from the Stepper Motor and the post on the Left Lower Drive Shaft Bracket. See Figure 5-25.

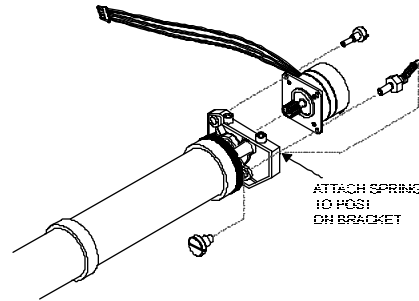


Figure 5-25. Stepper Motor Removal/Installation.

12. Remove the hardware securing the Stepper Motor to the Left Lower Drive Shaft Bracket and remove the Stepper Motor.

Install the Lower Roller Assembly, Stepper Motor and Vacuum Fan

1. Loosely attach the Stepper Motor to the Lower Roller bracket using Stepper Motor hardware as shown in Figure 5-19.
2. Attach the Stepper Motor tension spring to the Stepper Motor and the Lower Roller Bracket. Tighten the Stepper Motor hardware to 8 in-lb of torque.

CAUTION

It may be necessary to loosen (do not remove) the screws that secure the Y-Arm Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen while installing the Lower Drive Roller Assembly.

CAUTION

It may be necessary to loosen (do not remove) the screws that secure the left Leg Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen when removing the Lower Drive Roller Assembly.

NOTE

Ensure that the Lower Drive Supports and Fan Assemblies are oriented in the correct position before inserting into the Platen. See Figure 5-24 for visual indication of correct orientation.

3. Slide the right side of the Lower Drive Roller Assembly inside of the left side of the Platen until the first roller is inserted.
4. Position and hold one of the Fan Assemblies under the Lower Drive Roller Assembly and between the first and second rollers. Continue to insert the Lower Drive Roller Assembly into the Platen.
5. Position and hold the other Fan Assembly (for PRO-60e only) under the Lower Drive Roller Assembly and between the seventh and last rollers. Continue to insert the Lower Drive Roller Assembly completely into the Platen.
6. Reaching inside the Fan Exhaust hole under the Platen, position and secure the Fan Assembly(ies) using a #2 Phillips screwdriver.
7. Reinstall the Fan Exhaust Assembly(ies) using a #2 Phillips screwdriver.

8. Install the Lower Drive Roller Assembly support brackets using a #2 Phillips screwdriver.
9. Reinsert the Foam Block. Make sure that the Stepper Motor and Fan(s) cables are exiting out of the back corner of the Foam Block. See Figure 5-26. The Foam Block is positioned between the Stepper Motor and the Servo Motor. Make sure it is not tilted at an angle.

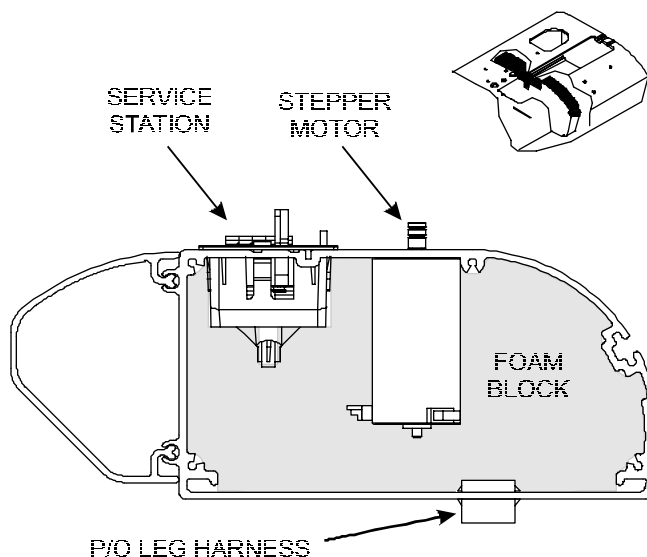


Figure 5-26. Inside Platen, Right Side.

11. Reinsert the Service Station.
12. Reinstall the Right Sideplate using a #2 Phillips screwdriver. Ensure that all cables from inside the Platen are exiting out of the large hole in the Sideplate.
13. Reinstall the Power Supply Bracket using four screws and a #2 Phillips screwdriver.

14. Perform steps 5 through 14 of the procedures to reconnect the MPCB.
15. Reinstall the Left Baseplate using a #2 Phillips screwdriver.
16. Reinstall the Left Sideplate using a #2 Phillips screwdriver.
17. Perform steps 1 through 4 of the Install the Ink Delivery System procedures to reinstall the Ink Delivery System.
18. Perform the Install Left, Top, and Right Covers procedures to install the Left, Top, and Right Covers.

Remove the Media Take-Up and Feed Sensor Brackets and Sensors

NOTE

The sensors for the media Take-Up and Feed Assembly are identical, but the brackets that they mount to have distinct differences. The top bracket has an additional extended arm attached to help in directing the media from blocking the sensor's beam path. Ensure that the bracket is being replaced with the correct bracket.

1. Remove all media and media rollers from the printer.
2. Disconnect the sensor leads from the printers leg assembly by squeezing the sides of the connector to release the quick disconnect latches.
3. With a pair of wire cutters, cut the wire tie wraps (see Figure 5-27) that is securing the sensor leads to the sensor bracket.
4. Remove the sensor by unscrewing the plastic nut off of the front of the sensor. Pull the sensor out of the bracket.
5. Using a #2 Phillips screwdriver, remove the two screws securing the bracket to the leg assembly.

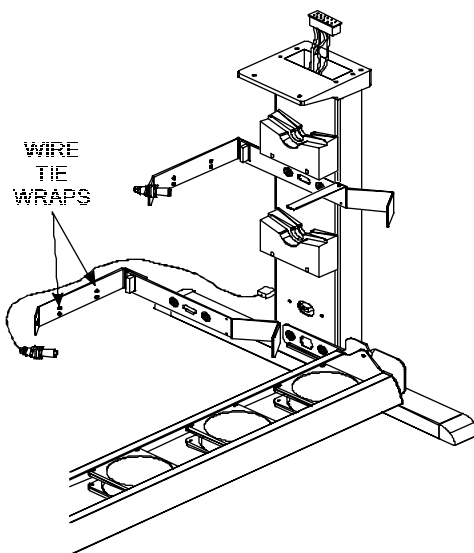


Figure 5-27. Media Take-Up and Feed Sensor Removal.

Install the Media Take-Up and Feed Sensor Brackets and Sensors

1. Using a #2 Phillips screwdriver, install the two screws securing the bracket to the leg assembly.
2. Insert the sensor into the hole on the sensor bracket, secure by screwing on the plastic nut onto the front of the sensor.
3. Route the sensor wires to the back of the bracket and secure the wires using two wire tie wraps.
4. Bringing the wire from under the bracket, attach the wire connector to the leg harness plug. Push connector in until firmly seated.

Remove the Media Take-Up and Feed Motors

1. Remove all media and media rollers from the printer.
2. Remove the four screws holding the Cradle Idler to the leg assembly. See Figure 5-28.
3. Carefully slide the Cradle Idler assembly out of the leg assembly until the wires going to the motor can be removed.
4. Remove the wires from the motor.
5. From the back of the Cradle Idler, disconnect the tension spring from the post located on the Cradle Idler.
6. Using a #2 Phillips screwdriver, remove the screw and washer holding the motor mount to the Cradle Idler. Carefully remove the motor, motor mount, and motor gear subassembly from the Cradle Idler.
7. Remove the C clamp that is securing the motor gear to the motor.
8. Using a #1 Phillips screwdriver, remove the three screws, washers, and lock washers from the motor mount to remove the motor.

Install the Media Take-Up and Feed Motors

1. Using a #1 Phillips screwdriver, install the three screws, washers, and lock washers that secures the motor to the motor mount.
2. Install the motor gear to the motor. Secure with a C clamp.
3. Insert the motor, motor mount, and motor gear subassembly into the back of the Cradle Idler. Tilt the subassembly slightly while installing to align the motor gear with the opening on the top of the Cradle Idler.
4. Screw in the screw and washer that secures the motor mount to the Cradle Idler.
5. Attach the tension spring to the post on the Cradle Idler.
6. Position the Cradle Idler assembly in front of the hole in the leg assembly. Attach the wire connectors to the motor (red to the positive terminal, black to the negative terminal.)
7. Insert the Cradle Idler Assembly into the leg and secure with four screws.

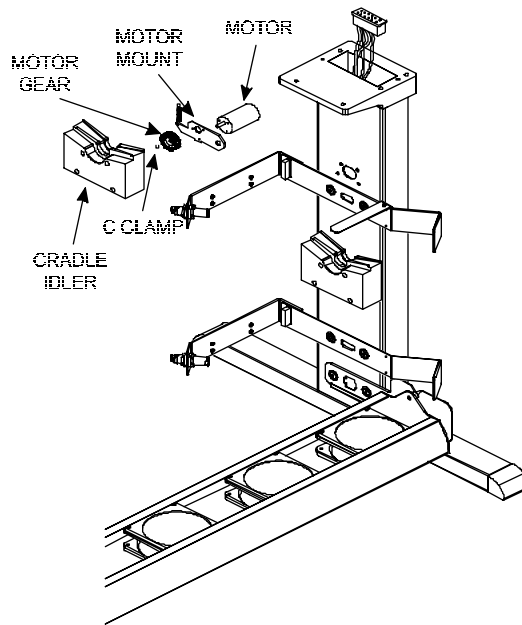


Figure 5-28. Media Take-Up and Feed Motor Removal.

Remove the Media Drying Fans

1. On the left side of the drying fan assembly is a black wingnut used to adjust the position of the fan assembly. Remove the black wingnut.
2. Disconnect the drying fan assembly leads from the printers leg assembly by squeezing the sides of the connector to release the quick disconnect latches.
3. Lift the entire drying fan assembly off of the printer.
4. Remove the air filter from the fan to be removed by squeezing

the tabs on the filter housing to release the housing off the fan.

5. Remove the four bolts securing the back bracket (the one with the positioning bolts on the bottom) to both of the side plates.
6. Pull the back bracket away from the fans to gain access to the faulty fan. Carefully pull the fan away from the front bracket until access is gained to reach the electrical connector.
7. Disconnect the connector to the fan.

Install the Media Drying Fans

1. Reconnect the electrical connection to the fan. Push the connector and wires into the bracket so the fan can be seated correctly on the bracket.
2. Carefully orient all the fans so that the back bracket can be installed correctly. Secure the back bracket to the side plates.
3. Install the air filter and air filter housing.
4. Lay the entire assembly onto the support brackets on the printer. Ensure that the cable connector is on the right side of the printer as it is installed.
5. Reattach the positioning wingnut on the left side of the assembly.
6. Attach the wire connector to the leg harness plug. Push connector in until firmly seated.

This chapter lists the items and their associated numbers for the parts and assemblies of the Novajet PROe series printers that are field replaceable. The list is in order of part name as identified in the assembly/disassembly chapter.

This list is to be used in conjunction with the assembly/disassembly procedures to acquire the necessary parts and properly install them into the printer.

The parts and assemblies may be ordered through your local authorized dealer or **ENCAD, Inc.'s** Technical Support and Service department.

FIGURE	ITEM	PART NAME	PART #
6-1	1	COVER, LEFT	208229
6-1	2	RESERVIOR ASSEMBLY.....	207616
6-1	3	CAP, RESERVIOR.....	207562
6-1	4	INK DELIVERY SYSTEM, 60e	207613-1
		INK DELIVERY SYSTEM, 42e	207613-2
6-1	5	DOOR, COVER	208231
6-2	1	COVER ASSY, TOP, 60e	207787-1
		COVER ASSY, TOP, 42e.....	207787-2
6-2	2	TRAILING CABLE ASSY, 60e	207573
		TRAILING CABLE ASSY, 42e	207584
6-2	3	STABILIZER ASSY WITH TRAILING CABLE AND ENCODER STRIP	
		60e	209070
		42e	209069

FIGURE ITEM		PART NAME	PART #
6-2	4	SLIDE SHAFT, 60e	207492
		SLIDE SHAFT, 42e	207493
6-2	5	BELT, 60e	207475
		BELT, 42e	207476
6-2	6	FRAME, TENSIONER	203870-1
6-2	7	SPRING, COMPRESSION	203999
6-2	8	IDLER ASSEMBLY	203405-1
6-2	9	AUTOFEED SENSOR ASSY	207629
6-2	10	PINCH ROLLER	207497
6-2	11	SERVICE STATION ASSY	207611
6-2	12	PLATEN ASSY, 60e	207496
		PLATEN ASSY, 42e	207509
6-2	13	KNIFE DAMPER ASSY	202000
6-3	1	COVER, RIGHT	208230
6-3	2	KEYPAD ASSEMBLY	207619
6-3	3	DISPLAY ASSY	207803
6-3	4	PWA, DISPLAY PWR CONVERTER	207775
6-3	5	POWER ENTRY MODULE	207508
6-3	6	FAN COOLING, POWER SUPPLY	207593
6-3	7	MAIN PRINTED CIRCUIT BOARD	207624
6-3	8	POWER SUPPLY ASSEMBLY	207618
6-4	1	MOTOR ASSY, SERVO	207517
6-4	2	STEPPER MOTOR ASSY	209071
6-4	3	FAN ASSEMBLY, VACUUM	203443
6-4	4	EXHAUST, GRILL	204976
6-4	5	LOWER ROLLER ASSY, 60e	207023
		LOWER ROLLER ASSY, 42e	207506

FIGURE ITEM		PART NAME	PART #
6-5	1	INK DELIVERY SYSTEM, 60e	207613-1
		INK DELIVERY SYSTEM, 42e	207613-2
6-5	2	CARTRIDGE TUBE ASSY, BLUE	207614
		CARTRIDGE TUBE ASSY, GRAY	207615
6-5	3	CARRIER PCB	207469
6-5	4	STRAIN RELIEF	208276
6-5	5	ENCODER SENSOR W/FLEX	206823
6-5	6	PAPER SENSOR W/FLEX.....	207095
6-5	7	CARRIER BUSHING	207961
6-5	8	CARRIER FRAME ASSY	207527
6-6	1	GUIDE, PAPER ADJUSTABLE	207644
6-6	2	CLAMP, GUIDE PAPER	207659
6-6	3	CRADLE, IDLER	207667
6-6	4	GEAR, MOTOR, DRIVE	207666
6-6	5	MOTOR, DRIVE	207767
6-6	6	BRACKET ASSY, SENSOR, TOP	207656
6-6	7	BRACKET ASSY, SENSOR, BTM	207752
6-6	8	SENSOR ASSEMBLY	207727
6-6	9	HARNESS, WIRING, LEG DRIVE	207731
6-6	10	FAN ASSEMBLY, DRYER	207725
6-6	11	FILTER, DRYER, FAN	207729
		HARDWARE KIT	208810
		LOOPBACK TEST CABLE	205462A
		J TAG ADAPTER	209219

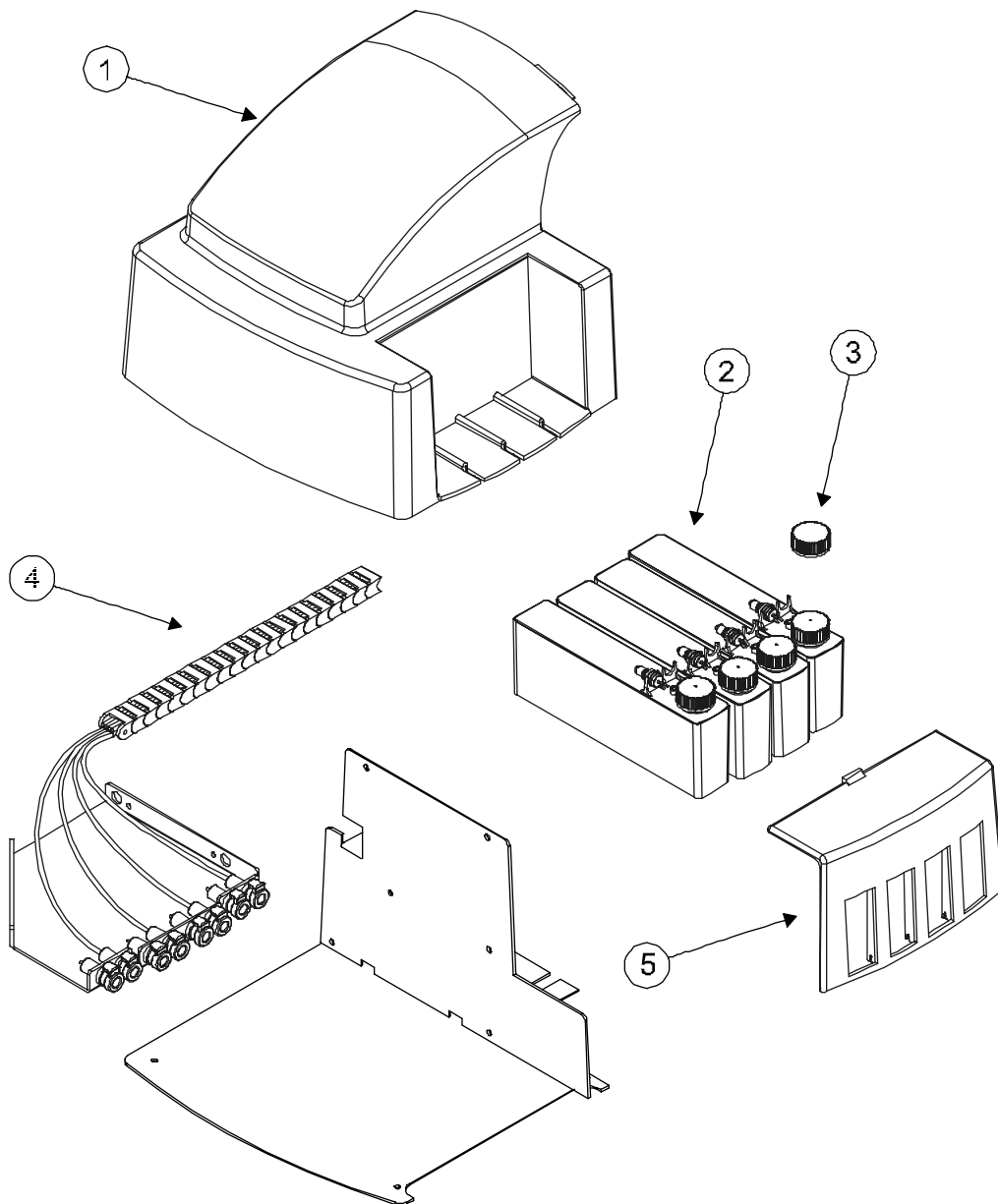


Figure 6-1. Left Side Parts Breakdown.

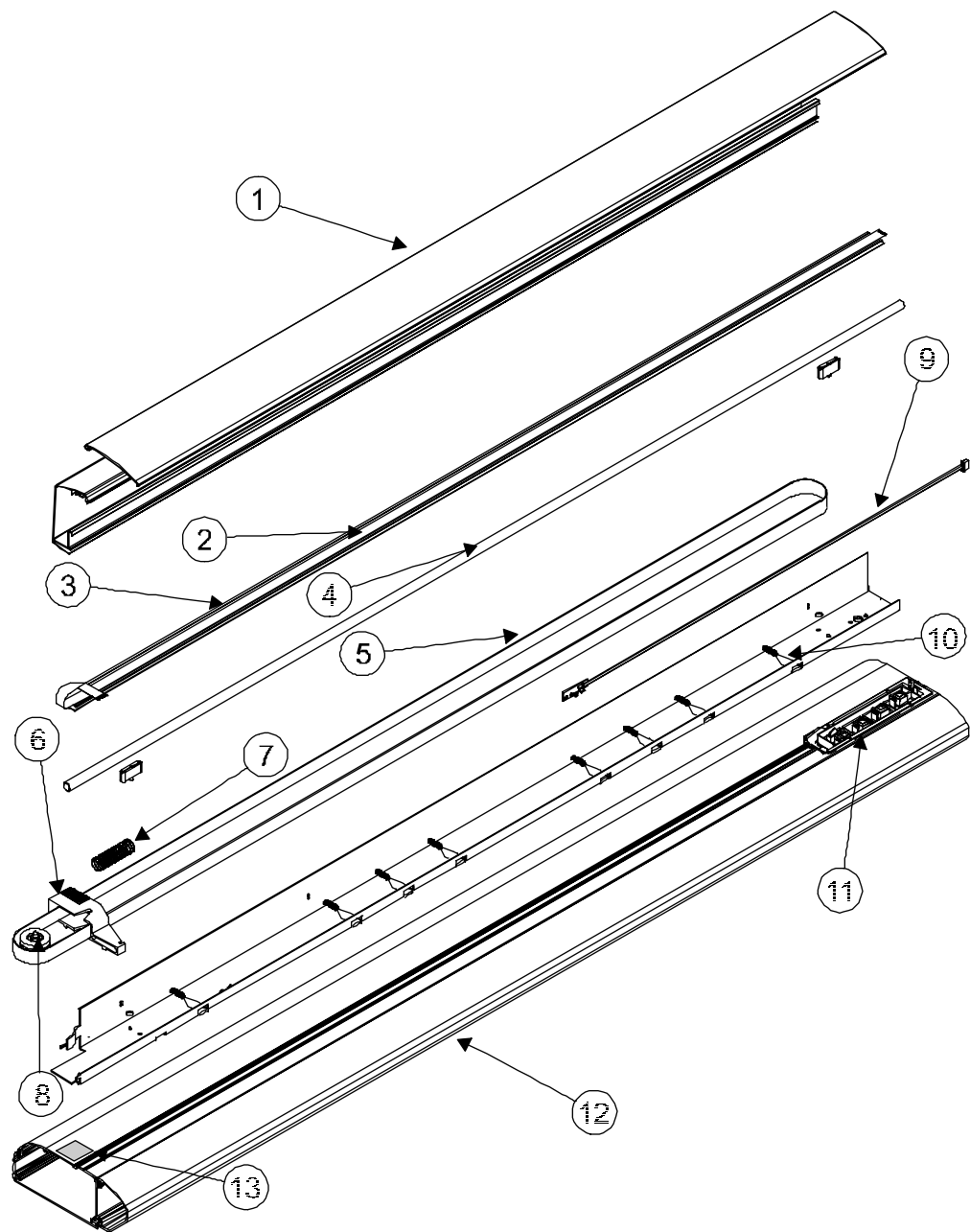


Figure 6-2. Platen and Above Parts Breakdown.

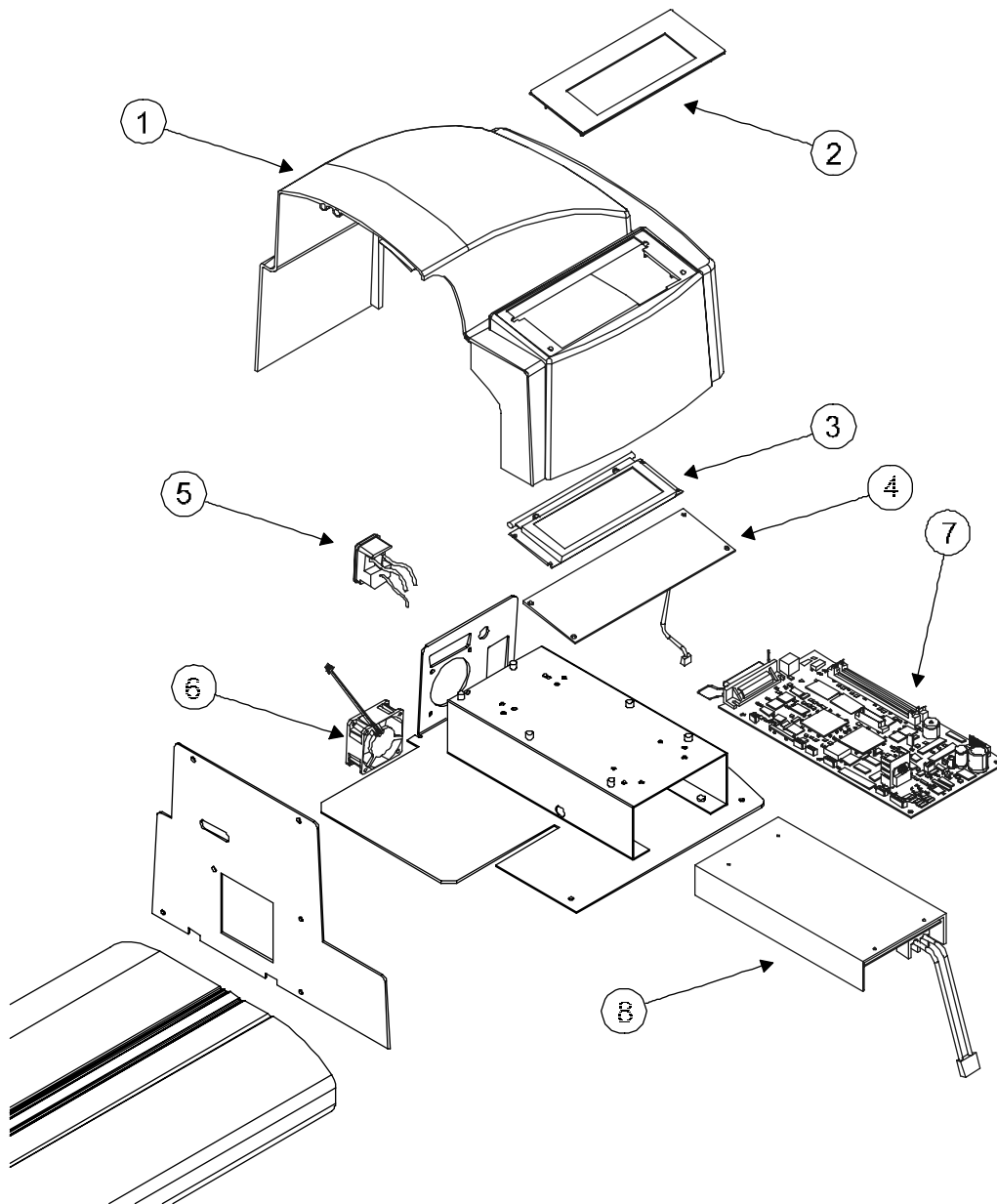


Figure 6-3. Right Side Parts Breakdown.

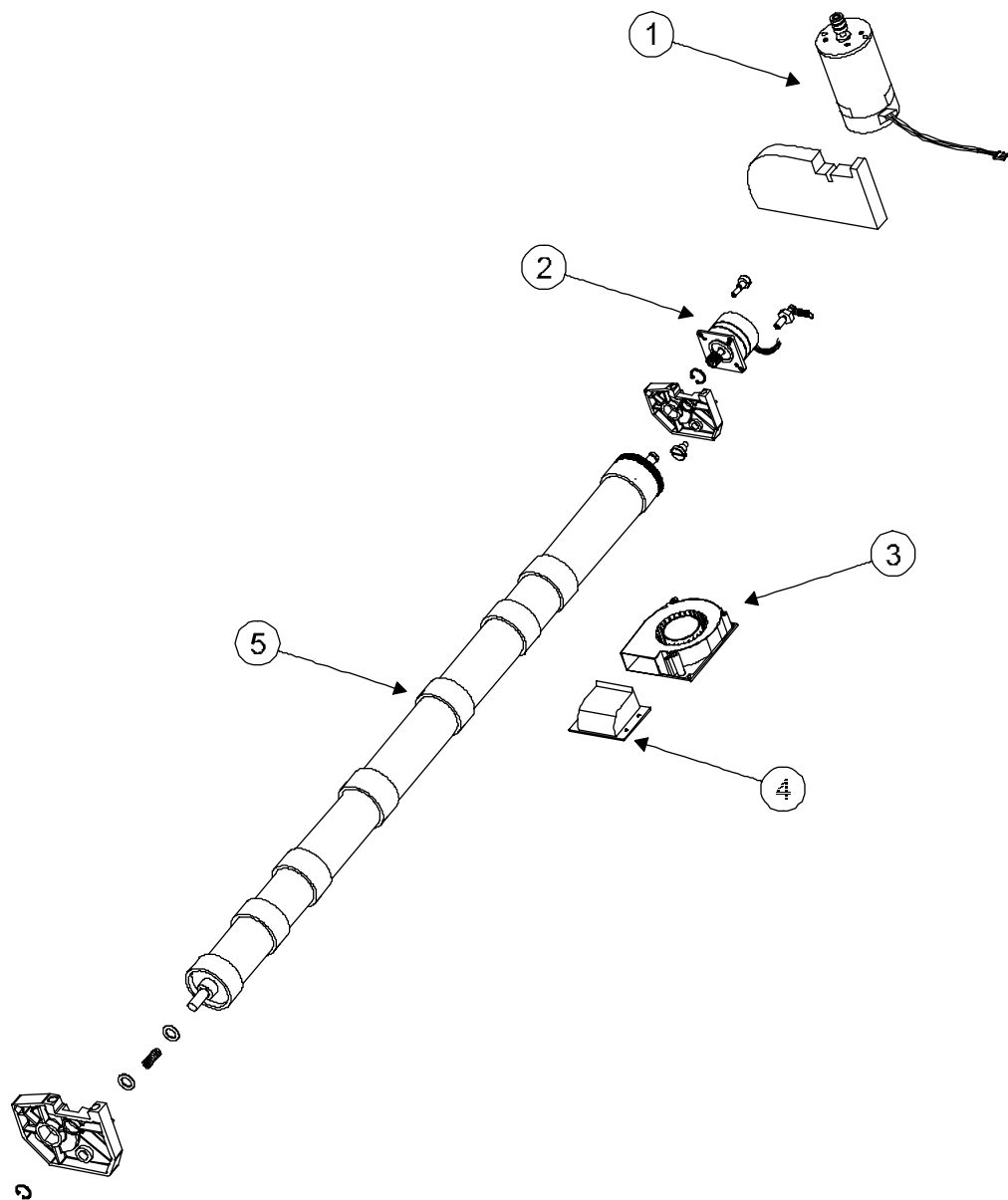


Figure 6-4. Inner Platen Parts Breakdown.

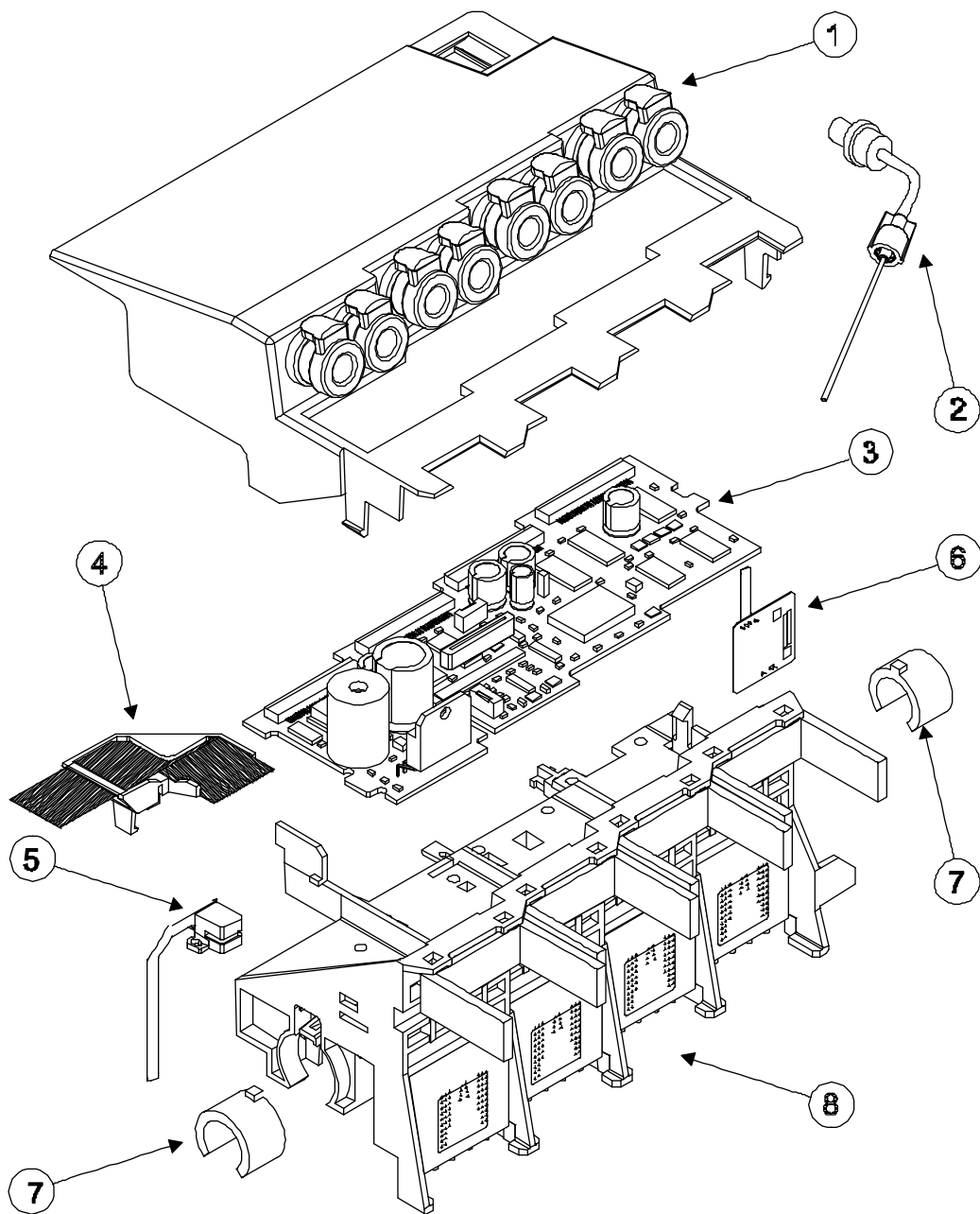


Figure 6-5. Carrier Assembly Parts Breakdown.

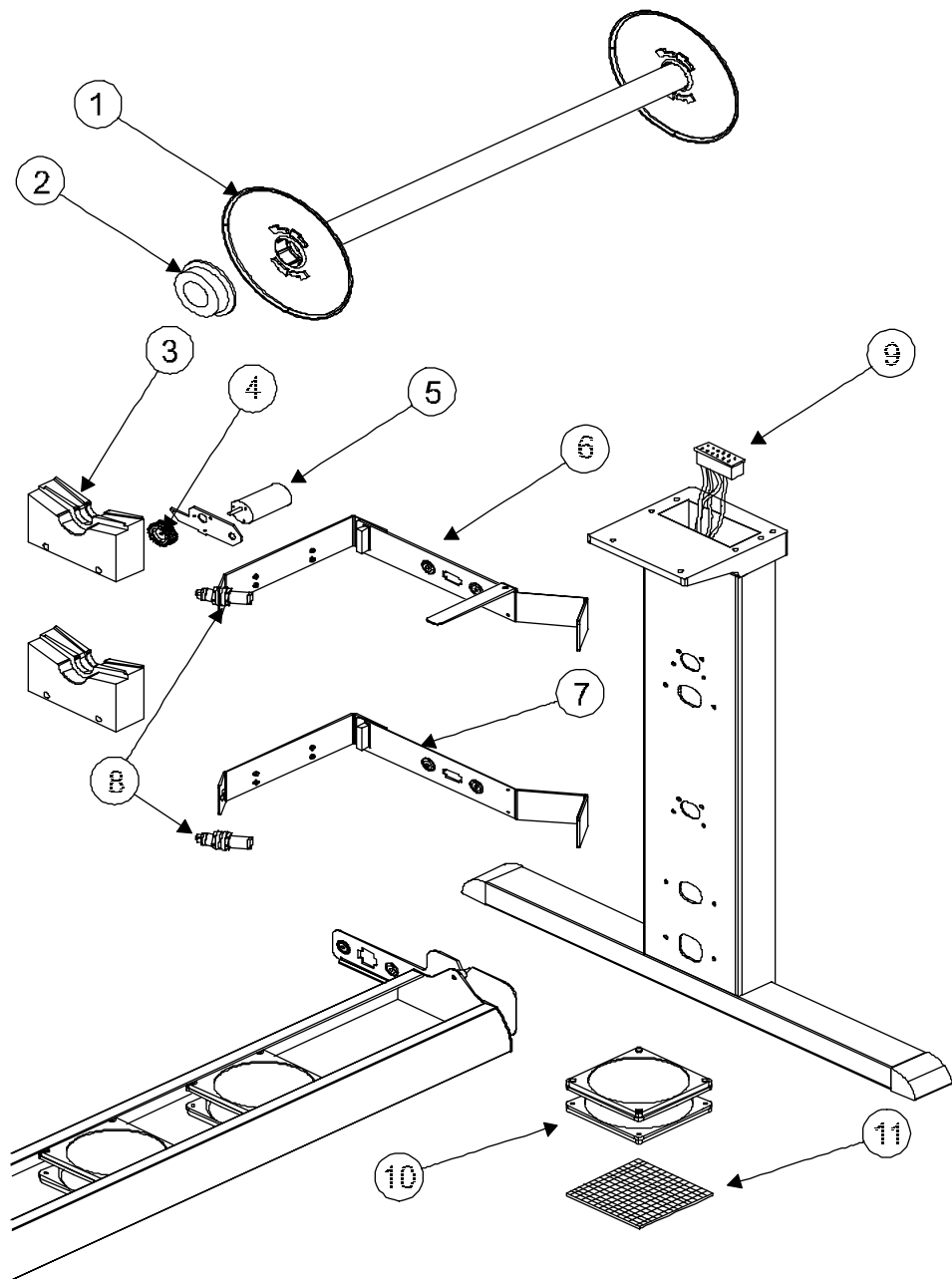


Figure 6-6. Power Feed and Take-Up Parts Breakdown.

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